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Skeptical Inquirer

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The German *Heilpraktiker*: A Relic of the Past

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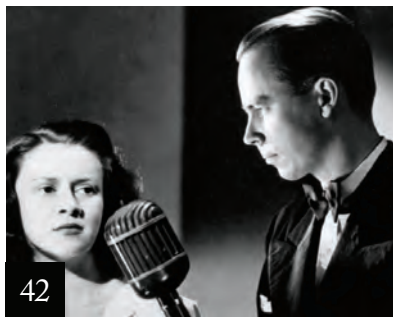

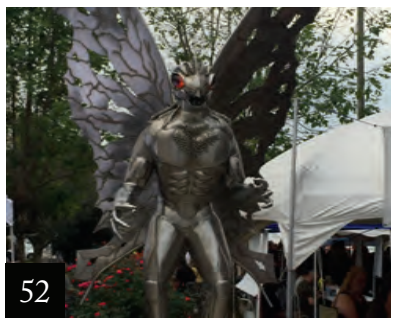

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[FROM THE EDITOR

Sociology of Conspiracy; Skeptics in Russia

People do things in groups that they wouldn't as individuals. Understanding human behavior requires attention not just to individuals but to the social groups that influence them, notes Jeffrey A. Victor. As author of our cover article, "The Social Dynamics of Conspiracy Rumors," the retired sociology professor brings his perspective to help us understand the conspiracy ideas so prevalent today. He prefers the term *rumors* to *theories*: "a rumor requires the participation of many people; it is a social phenomenon." As he notes, social groups are driven by forces beyond the individual personalities involved; the people who attacked the U.S. Capitol on January 6 acted in ways they probably would not act alone.

Victor should know. He originated the term *satanic panic* with his 1993 book of that title (and two SI articles before that), an analysis of the panics about Satanic cults that caught up so many people of the time. It was "a fascinating social phenomenon," he found. It all starts with a rumor, "a collaborative story telling process" and "collective group creation." People share juicy rumors as a form of bonding. People in different communication networks "live in different social worlds," and *that* has worsened today with social media. This all leads to "the consensus validation of reality," where people in a particular group hear the same story over and over from their friends. The rumors play on fear. The dominant fear now is of unfamiliar people, a result of demographic changes in America—leading to white Christian nationalism. Another key is this sociological principle: "If people believe that something is real, it is real in its consequences." Satanic cult rumors hurt a lot of people, and today QAnon conspiracy rumors are even more dangerous because "they pose the threat of large-scale violence." In the end, "Attempts to control dangerous conspiracy rumors must deal with them as a social phenomenon and not simply an expression of the personality quirks of individuals."

* * *

What is it like to be a skeptic today in war-torn Ukraine? Or, for that matter, in Russia, the aggressor, where state oppression has extinguished all remaining free expression? In our news and comment section, Stuart Vyse shows how skeptics in Ukraine quickly switched from classic skeptical topics to war-related ones. And in our moving special report, Czech skeptic Pavel Šmejkal contacted a skeptic friend in Russia and got us three first-person reports. They vary but all are heart-breaking. "It is hard to talk about any support for science and critical thinking when the power in the country belongs to crazy, inhuman conspiracy theorists," says one. "Almost nowhere else do they have such power. … In Russia, Putin has no deterrents."

"I think that, in general, everyone is shocked," a second Russian skeptic writes. "The younger generation, in my opinion, is for the most part categorically against the war—and depressed." He is considering emigrating.

"Of course, critical thinking still exists in Russia," a third writes, but if you touch on anything related to criticism of the current regime, "you are in danger." He concludes, "I would like to wish for all readers of Skeptical Inquirer that fear will never invade your homes. Cherish the freedom to think critically, study, and pass on your knowledge. … And hold onto each other."

—Kendrick Frazier

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Our Vision: A world where people value evidence and critical thinking, where superstition and prejudice subside, and where science and compassion guide public policy.
Our Values: Integrity, Courage, Innovation, Empathy, Learning, and Wonder.

CFI Sues Homeopathy Maker Boiron for Deceiving Consumers with Junk Meds

Paul Fidalgo

The Center for Inquiry (CFI) has filed a groundbreaking lawsuit against Boiron, Inc., one of the largest manufacturers of homeopathic products in the world, for deceiving vulnerable consumers with useless products dressed up to look like real medicine.

CFI, which fights on behalf of consumers against pseudoscience, says Boiron routinely makes false claims about what its products will treat and heal, misleading the public about the absurd pseudoscientific basis for Boiron products and even lying about the ingredients their products contain.

CFI and its Committee for Skeptical Inquiry publish the Skeptical Inquirer.

"The facts could not be more clear. Boiron profits massively by deceiving consumers in their time of need," said CFI Vice President and Legal Counsel Nicholas Little. "Boiron knows its products are worthless junk, so they do everything they can to obscure the truth in order to offload their snake oil upon the unwitting, the ill-informed, and the vulnerable. They can't be allowed to get away with it any longer."

Adherents of homeopathy claim, without evidence, that a substance that causes harm to a healthy person will cure anyone else suffering the same type of harm. In homeopathic products, the "active" ingredients are highly diluted mixtures of the so-called cures; the ingredient ends up so diluted that often literally no trace of the original substance remains. Manufacturers such as Boiron then sell minuscule amounts of the already incredibly diluted ingredients, promising astounding results.

In its lawsuit, brought under the District of Columbia Consumer Protection Procedures Act, CFI alleges that Boiron sold a plethora of materially identical products, each made up of sugar pills and powders. Despite no scientifically detectable active ingredient, Boiron falsely promises consumers that each item will treat and cure a particular illness, injury, or health condition.

"Boiron sells little pills of sugar with grandiose claims. It's hard to believe anyone would try to pass off such junk as a surefire way to treat painful skin problems, heal mental health issues, and even to counteract menopause," said CFI Staff Attorney Aaron D. Green. "But Boiroin has been doing just that by tricking consumers into risking their health and throwing away their money on its fancy faux 'medicines.' It's time for Boiron and all homeopathy hucksters to be held accountable."

"Boiron knows its products are worthless junk, so they do everything they can to obscure the truth."
—CFI's Nicholas Little

In its complaint, CFI notes, for example, that Boiron sells *Saccharum officinale* as a treatment for "nervous agitation in children after overindulgence." However, Green notes, "Most parents would rightfully be skeptical of this product if Boiron told them what *Saccharum officinale* actually is: Table sugar."

According to recent industry accounts, 85 percent of consumers who purchased homeopathic products did not realize they were homeopathic, and nine out of ten consumers did not even know what the term *homeopathic* meant. Apart from selling products they know are useless, CFI says Boiron also misrepresents the products' ingredients. Four Boiron products were analyzed by an independent lab, and not only were no traces of the supposed active ingredient found, one of the *inactive* ingredients could not be scientifically detected.

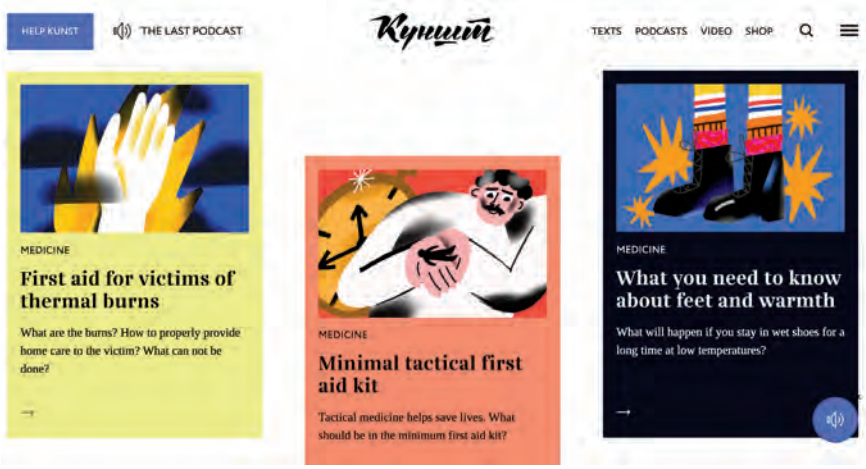
CFI VP and Legal Counsel Nicholas LIttle

The Center for Inquiry is currently engaged in other lawsuits regarding homeopathy, including consumer protection cases against megaretailers CVS and Walmart for their sale and marketing of homeopathic products, a matter recently heard by the D.C. Court of Appeals. CFI is also engaged in an active Freedom of Information Act lawsuit that demands the U.S. Department of Health and Human Services grant the public access to the *Homeopathic Pharmacopoeia of the United States*, upon which federal regulation of homeopathy is based. The industry restricts access to this "bible of homeopathy" to those willing to pay thousands of dollars for the privilege. ■

Paul Fidalgo is CFI's communications director. He has recently been named editor of *Free Inquiry*.

Science Communication during the Ukraine War

Stuart Vyse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A Google translated screenshot taken from the Kunsht website on March 26, 2022.

In August 2021, I was contacted by an editor at Kunsht (https://kunsht.com.ua/), a Ukrainian media group that covers science and technology "to promote critical thinking among Ukrainian youth." Kunsht interviewed me for a podcast series on magical thinking in relation to astrology and numerology, and although doing the interview over Skype was a very enjoyable experience, I promptly forgot about it.

In March 2022 after Russia's Vladimir Putin invaded Ukraine, I was reminded of the group and took another look at its website. What I saw was both heartbreaking and enormously impressive. With the help of Google Translate, I discovered that the Kunsht group had transformed their site to provide useful science-based information for a country under siege. Prior to the attack, Kunsht was featuring articles such as "Preserve the Youth: How to Study Vaccines for Children" and "Back in the Past: Can We See the Big Bang?" After the war broke out, its articles had titles such as "Food during War: What and How to Cook," "Russian Troops Control Two Nuclear Power Plants: What Is the Threat?," and "What Is Botulism and How to Safely Eat Canned Food."

I discovered that the Kunsht group had transformed their site to provide useful science-based information for a country under siege.

I contacted two of Kunsht's editors, who said they had moved their operation to safe locations. They seemed to be in remarkably good spirits but had quite obviously seized the opportunity to employ their expertise in science to provide practical, potentially lifesaving information for their fellow citizens. One of the editors told me, "We are, of course, optimists, so we moved our 'ordinary' materials to mid-April." By publication time, their optimistic hopes for a quick end of the war had not been realized, but their valiant science communication effort continued.

If you would like to support Kunsht's work, you can do so at https://kunsht.com.ua/druzi/. ■

Stuart Vyse is a psychologist and SI's "Behavior & Belief" columnist.

CFI Creates Office of Consumer Protection from Pseudoscience

The Center for Inquiry has established a new arm in its battle against quackery, bringing all its efforts in this arena together under one proverbial roof.

On April 15, CFI announced the launch of its Office of Consumer Protection from Pseudoscience. It will bring legal action, issue warning letters, and seek to educate and inform the public and legislators—both state and federal—to properly protect the public from the harms of these scam products and "treatments."

The website to the new office includes a contact section for consumers to tell CFI where they see pseudoscience being used to defraud.

"Core to CFI's mission is challenging pseudoscience," CFI Vice President and Legal Counsel Nick Little said in announcing the new office. "It's not enough just to be right in these situations. As skeptics and humanists, we have an obligation to protect people from the harm pseudoscience represents. Now we are doing it under a new name and a single organization—the Office of Consumer Protection from Pseudoscience." ■

Age of Greenland Crater Deals Blow to Younger Dryas Impact Hypothesis

Mark Boslough

"This is the way science works and should work," said Kurt Kjær, a geologist at the Natural History Museum of Denmark and codiscoverer of the Hiawatha Crater under the Greenland Ice Sheet. He and colleagues recently determined the crater is 58 million years old, far older than proponents of a controversial hypothesis had hoped (*Science*, March 11, 2022, p. 1076).

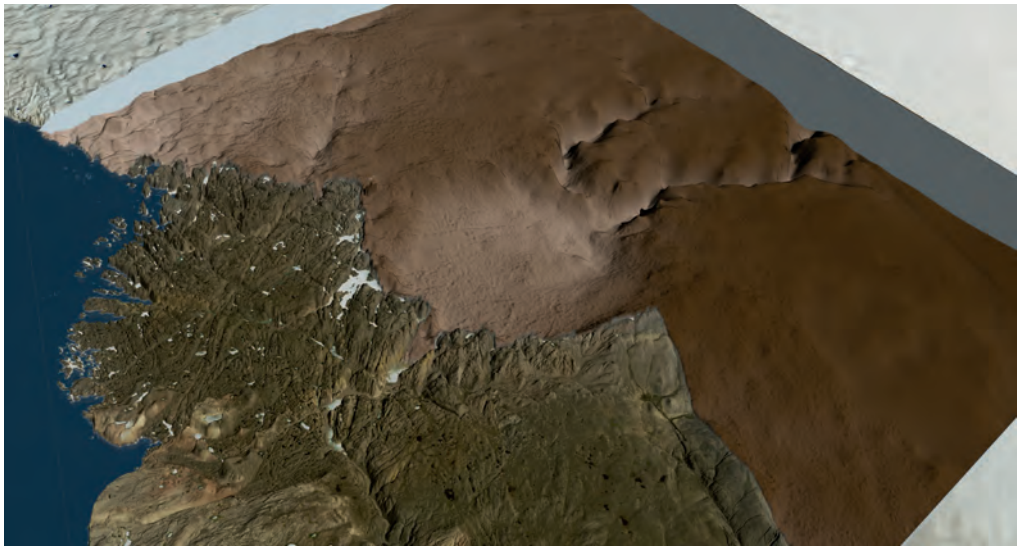
When the crater's discovery was announced in 2018, the mere possibility that it could have been formed only a geologic eyeblink ago (say, around 12,800 years ago) and therefore could have caused a climate shift and extinction led to exuberant reporting (see Boslough, "Crater Discovery Story Flawed by Premature Link to Speculative Impact Hypothesis," Skeptical Inquirer, March/April 2019).

Proponents of the Younger Dryas Boundary (YDB) impact hypothesis made bold predictions: "I'd unequivocally predict that this crater is the same age as the Younger Dryas," pronounced James Kennett of the University of California, Santa Barbara (*Science*, November 14, 2018).

Subject matter experts were more circumspect. Christian Koeberl (University of Vienna) noted the lack of evidence: "There should be thick ejecta layers in all ice cores nearby. Yet there's nothing" (*Popular Science*, November 16, 2018).

Clark Chapman (Southwest Research Institute) highlighted the improbability compared to something as old as two million years, noting that "It would be at least a hundred times less likely that it could have happened so recently as to have affected the Younger Dryas" (*Science News for Students*, January 2, 2019).

Greenland ice core and paleoclimate expert Richard Alley told me:



NASA digital elevation model with the ice sheet removed to show surface of bedrock in the region around the Hiawatha Glacier. Credit: NASA's Scientific Visualization Studio

> A few shards of glass from a volcanic eruption are enough to stop an ice-core processing line so the workers can take pictures, even getting selfies with it. Nothing showed up in any cores in the Younger Dryas. An impact near the coast that threw material up to Summit would have left chain-saw-dulling material at Pakitsoq near the coast, but nothing showed up.

Elizabeth Silber (Sandia National Laboratories, adjunct at the University of Western Ontario) published simulations of impacts into ice to see if a crater could have formed without leaving evidence in ice cores, despite only "occurring once every ~2 million years." Her models, under carefully specified conditions that assumed thick Pleistocene ice, couldn't rule out a young age (< 2.6 million years; see ArXiv:20-4:07909). She acknowledged the physical possibility of an improbably young crater. Now, after coauthoring the confirmation of its ancient age, she told me, "Our modelling results indeed support the slow erosional rates and are consistent with the crater being millions of years old."

YDB impact enthusiasts, who had argued that their hypothesis should be promoted to a "theory," were disappointed. Devotees had considered the Hiawatha Crater their smoking gun despite expert opinion. Their hopes now hinge primarily on their own definition of *impact markers* that contradicts long-standing mineralogic and geochemical criteria established by impact specialists (Jaret and Harris, *Nature Scientific Reports*, March 25, 2022).

Responding to the new paper, Kennett said, "I don't think it's related to the Younger Dryas now." But he says the team still believes in their impact hypothesis and will continue to do research on what they still think is impact evidence. "It's all alive and well and very active" (*Science*, March 11, 2022). ■

Mark Boslough is an impact physicist at Los Alamos National Laboratory and faculty member at University of New Mexico. He is a fellow of the Committee for Skeptical Inquiry.

E.O. Wilson Follow-Up: Race and 'Vigilantism,' Ants and Spiders

Kendrick Frazier

Bert Hölldobler (left) and Edward O. Wilson. Photo by Kathy Horton, courtesy of Hölldobler.

My lead article in our seven-page memorial section for the late biologist and CSI Fellow E.O. Wilson (May/June 2022) included a long paragraph about recent accusations of racism against Wilson due to a letter he once wrote in support of controversial Canadian psychologist J. Philippe Rushton. I ended, "Of course Wilson is no longer here to respond to the accusations."

Maybe not, but one of his most esteemed collaborators, biologist Bert Hölldobler, has strongly responded. Now a Regents Professor at Arizona State University, Hölldobler was Professor of Biology and Alexander Agassiz Professor of Zoology at Harvard from 1973–1990, where, like Wilson, he studied social organization in insects, especially ants. He is a member of both the U.S. and German National Academies of Sciences. He coauthored with Wilson the Pulitzer Prize–winning book *The Ants*, and subsequently they coauthored three other books, most recently *The Leafcutter Ants* (2011). Hölldobler has now published a vigorous defense of Wilson, "Self-Righteous Vigilantism in Science: The Case of Edward O. Wilson." The 2,500-word text is available online at eSKEPTIC, April 5, 2022.

Hölldobler kindly gave Skeptical Inquirer permission to quote from it.

"It is clear to me that Ed could not have paid much scrutiny to Rushton's work but rather was motivated by the impression he got from Rushton's own description of his plight, namely, that he was being persecuted by far-left wing ideologues, as Wilson himself had been after publication of *Sociobiology*," Hölldobler writes.

"Wilson's positive response to Rushton's pleas appears to me naïve. I assume that he realized this later too, because to my knowledge he never cited Rushton's work nor mentioned it in conversations I had with him."

Hölldobler concludes: "Given Wilson's numerous articles, books, lectures, and public statements, which contain nothing even remotely supportive of racism, it seems unfair to zero in on this limited correspondence with a single colleague to be waved like a red flag to tarnish a scholar's reputation. … Such self-righteous vigilantism is highly unjust and distortive."

Hölldobler also says Wilson wrote in a note to *Nature* (Vol. 289, February 19, 1981), "I am happy to point out that no justification for racism is to be found in the truly scientific study of the biological basis of social behaviour."

Hölldobler tells the Skeptical Inquirer his "Self-Righteous Vigilantism" piece went through multiple versions. He first submitted it to the *New York Review of Books*, which has published recent criticisms of Wilson as well as those way back in the *Sociobiology* years that caused Wilson such anguish. They declined. He reframed it, had it critically reviewed, and resubmitted it. They again rejected it. But now it has seen the light of day, and he is grateful for whatever attention it might get. He tells SI, it is "my defense of my friend Ed, who cannot defend himself anymore."

* * *

On a far lighter note, our family friend Susanne Page has shared with me some memories that show E.O. Wilson's human side, and she agreed I might share them with you. She, a noted professional photographer, and her late husband Jake Page, then a writer, editor, and columnist for *Smithsonian* magazine, once went on a trip to the Amazon with Wilson. The occasion was to report on a World Wildlife Fund project by Smithsonian biologist Thomas Lovejoy, but Wilson came too. They were camped somewhere outside of Manaus, Brazil.

"It was dark, after dinner, with an oil lantern for light and sleeping hammocks in the background shadows, and we were sharing a wee bit of warm Brazilian beer," she says.

"In the middle of general discussions, an ant marched across the rough-hewn table, and Ed paused, squinted … and announced its Latin name," she recalls. "At another point a very large, hairy spider wandered up the post by which I was sitting, about three inches from my arm. Ed rushed over and identified it, then went on with the conversations."

One time a parrot that just hung out near the camp "really did land on Ed's head, then Tom's head." She thinks *Smithsonian* used that image in its article. "To bathe, we had a nearby creek with a swimming hole, and the water was *filled* with neon tetras," she recalls.

She says Wilson talked a lot on that trip about how he regretted that biologists were never portrayed in movies other than as dweebs. He wished instead they could be shown as sexy, and he had a lot of fun talking about perfect actors for the job. "The conversation was very jolly." ■

Kendrick Frazier is editor of the Skeptical Inquirer.

'Huggy Wuggy' Media Scare Goes Viral

Benjamin Radford

A panic circulated in schools and online in early April 2022, but it was no April Fool's Day prank. The fear was over a thin, towering, cartoonish, fluffy blue figure with a gaping maw and terrifying teeth named Huggy Wuggy.

As to what, exactly, the threat was, it depended on what version of the story you saw. Some said that the threat was merely scaring children (or misleading them into embracing a terrifying figure); others said that Huggy Wuggy encouraged children to kill each other, siblings, or their parents. One British school administrator, David Hegarty, posted a warning on social media:

> It has been brought to my attention that a character named "Huggy Wuggy" is being viewed by our children online. … The character can be easily viewed on YouTube channels and is a teddy bear with razor-sharp teeth that sings worrying songs about hugging and killing. In one of the videos, the bear asks the viewer to take their last breath. It is a very deceiving character, as hugs should be seen as something kind and loving.

On April 7, the Sheriff's Office in Lafayette County, Wisconsin, issued a warning "due to a series of videos surrounding … Huggy Wuggy. The warnings are due to the character's initially child-friendly visuals, which very quickly turn nightmarish."

Misinformation was rampant, and—as with many scares—there was a grain of truth to the rumors. Huggy Wuggy is a character in a 2021 horror video game called *Poppy Playtime*. But despite the concerns of parents and school officials, the character was never marketed, nor intended to appeal, to children. *Poppy Playtime* is not available on age-restricted platforms, though it's true that Huggy Wuggy appeared on some media accessible to children, such as YouTube. However, that was user-generated content, not official content. Once a fictional character is released to the public, it becomes in a sense public domain—not legally but folklorically. Any figure—from Harry Potter to James Bond to Spock to Darth Vader—appears in everything from fan art to costumes to videos to slash fiction. Those concerned about Huggy Wuggy conflated the two, mistakenly thinking that the real-but-rare versions of the figure seen on kids' platforms were placed there to harm kids.

Because the character was never intended for children, the concern that the character is "deceiving" is misguided at best. This taps into perennial parental fears about deceptive marketing, especially to children. However, the figure is patently frightening and unlikely to be mistaken for one of the Muppets. In its proper context—which is off limits to anyone under twelve—it's clear what Huggy Wuggy is: a villainous target in a first-person shooter game. Most importantly, despite the hype and fear, there is no evidence that the character inspired any violent acts in homes or schoolyards around the world.

Many Skeptical Inquirer readers will recognize the Huggy Wuggy scare as the latest in a long line of internet-based moral panics, including the Blue Whale Game and the Momo Challenge (see "The Rise and Fall of the 'Momo Challenge' Online Suicide Game Conspiracy" in the May/June 2019 SI). The evidence for these threats is built largely on rumor and conjecture. It's also part of a long tradition of paternal fear over seemingly innocuous kids games that allegedly have a sinister side, including trick-or-treating, Ouija boards, Dungeons and Dragons, and the Charlie Charlie Challenge (see Massimo Polidoro's column in the November/December 2015 SI). Despite no credible threat posed by Huggy Wuggy—or to the presumed impressionable youth who watched content featuring it—police and parents predictably used it as teachable moment. Chief Inspector Joanne Gibson issued a statement:

7:34
4G
KIDSPOT
Posts
Follow
kidspot
Creepy online figure pushes kids to kill their parents
Liked by missyjenjenz and others
kidspot "I could hug you forever until you breathe your last breath. My teeth sharp and ready, in my grasp, yeah they're deadly."
This is just one of the chilling lines from a video featuring Huggy Wuggy – a sinister animated character that encourages kids to "kill babies and their parents".
Head to the link in bio for what you need to know to protect your little ones.

> I urge parents and guardians to continue to talk to their children and young people about being safe online, while also ensuring they are fully aware of what they are viewing. It's important to make your child aware of online dangers and make sure they know they can speak to someone if anything or anyone online causes them concern or upsets them. ■

Benjamin Radford is deputy editor of Skeptical Inquirer.

Science Tackles Misinformation in Special Section

It is not just skeptics anymore. The entire scientific community is becoming increasingly concerned about misinformation and disinformation as a serious national problem. Scientists increasingly must overcome lies and half-truths about their work as well as online harassment and, sometimes, even threats once it is published. This is especially true when dealing with hot-button issues. Evolutionary biologist Karl Bergstrom believes that "bullshit" spread online has become one of the biggest threats facing humanity in the twenty-first century and that studying it and learning how to combat it is as important as climate science.

The journal *Science* published a special section on "The Social Media Storm" in its March 25, 2022, issue (vol. 375, Issue 6587). The eighteen-page illustrated section examined a wide variety of challenges. There is too much to summarize here, but we recommend that all scientific skeptics check it out. Contents include:

• "Inside the Vortex" (introduction) by Martin Enserink. "Facebook, Twitter, and other platforms may have given everyone a voice, but they've also unleashed a storm of negative effects—spreading disinformation,

inciting hate, and endangering democracy."

• "On the Trail of Bullshit: Studying Misinformation Should Become a Top Priority, Says Biologist Carl Bergstrom" by Kak Kjupferschmidt. "Misinformation has reached crisis proportions," Bergstrom and University of Washington colleague Jevin West wrote in a 2021 paper in the *Proceedings of the National Academy of Sciences.* "It poses a risk to international peace, interferes with democratic decision-making, endangers the well-being of the planet, and threatens public health." He and others, in the same issue of *PNAS*, called upon researchers to study misinformation as "a crisis discipline" and learn how to stop it.

• "In the Line of Fire: Scientists Have Been Harassed for Years. But a *Science* Survey Shows the Pandemic Has Made Things Worse for Some" by Cathleen O'Grady. With six graphics: "An Outbreak of Harassment," showing that 38 percent of COVID-19 researchers report being harassed; "A New Wave of Abuse"; "Views That Draw Vitriol"; "The Effect of Exposure"; "A Serious Toll"; and "Coping Mechanisms" (the top three of which were block or mute individuals on social media, stop reading comments online, and turn down some opportunities for publicity).

• "Riding the Twitter Wave: Enthusiasm for the Social Media Platform Changed Science Communication during the Pandemic. But Will It Last?" by Jeffrey Brainard.

The issue's introduction concludes: "The social media storm isn't calming down. How we cope with it in the years ahead may determine whether we end up in a better place—or one that's far worse." ■

New Yorker Profile of Loftus Wins Magazine Award

A lengthy profile of CSI Fellow Elizabeth Loftus, "one of the most influential psychologists of the twentieth century," has won its author a major magazine award. *New Yorker* staff writer Rachel Aviv won an "Ellie" in the Profile Writing category for what the magazine called her "nuanced" portrait of Loftus, one of the world's leading experts on memory who has researched and shown that memories are reconstructed and very fallible. The article, "How Elizabeth Loftus Changed the Meaning of Memory" (April 5, 2021), described her innovative research and showed how it came into conflict with contemporary moral issues. In what seemed controversial and uncomfortable for many, it also delved rather deeply into Loftus's own family and personal life. ■

Michael Mann Moving to University of Pennsylvania

Michael Mann is set to leave Pennsylvania State University, where he is Distinguished Professor of Atmospheric Science, and on September 1 assume a new position at the University of Pennsylvania. According to a University of Pennsylvania news release, Mann, a fellow of the Committee for Skeptical Inquiry, will become a Presidential Distinguished Professor in the Department of Earth and Environmental Science and a fellow of the Kleinman Center for Energy Policy. He will also become the inaugural director of a new Penn Center for Science, Sustainability, and the Media and a distinguished research fellow at the Annenberg Policy Center. ■

QAnon Followers Focus on Migrant Children at Southern Border

Julia Lavarnway

Talk about the unsinkable rubber duck! Believers in QAnon, what SI contributor Stephanie Kemmerer called "the ultimate conspiracy—the mothership; the umbrella; the 'Choose-Your-Own-Adventure' saucerful of secrets and codes" (SI, March/April 2021), are at it again. Undeterred by their beloved Donald Trump losing the 2020 election, and thus failing to fulfill the mysterious Q's prophesy, supporters are marching ahead promoting their ridiculous—and more pertinently often dangerous—ideas.

One of these ideas has to do with their continued obsession with child trafficking (see Stuart Vyse's "Beware the Child Rescuers," SI, July/August 2021), perhaps most infamously demonstrated in the Pizzagate conspiracy theory (see "Pizzagate and Beyond: Using Social Research to Understand Conspiracy Legends" by Jeffrey S. Debies-Carl, SI, November/December 2017). Now the QAnoners are turning their fear-mongering paranoia regarding child snatchers to migrant children at the southern border of the United States.

In an article for the *New York Times*, "QAnon Joins Vigilantes at the Southern Border" (May 9, 2022, https://www.nytimes.com/2022/05/09/us/border-qanon-arizona.html), reporter Miriam Jordan described one such QAnon devotee, Jason Frank, who has set up a camp by the border wall in Sasabe, Arizona. Frank, along with his cadre of fellow QAnon adherents, believe that children who are crossing the border from Mexico into the United States are in grave danger—and he plans to do something about it. Frank insists that migrant children "are being trafficked, sex trafficked. That's the No. 1 trade," as he is quoted in Jordan's *Times* article. But, as Jordan also notes in her article, "Minors crossing the southern border as part of sex-trafficking schemes is unusual, according to groups that monitor and combat trafficking."

So what do Frank and his buddies do when a group of migrant children cross their path? According to Jordan, they give them food, water, and even T-shirts with the right-wing slogan "Let's Go, Brandon!" emblazoned on them. They also give out Bibles and form prayer circles with the kids. This all sounds innocuous enough, I guess—despite the high creep factor of a bunch of scraggly-bearded dudes swathed in camouflage interacting with groups of children who don't speak their language—but the group also engages in more sinister activities. Frank admits, according to Jordan's piece, that "his group was asking children to provide the addresses and phone numbers of the family members or family friends they planned to join, then contacting those individuals." Frank is quoted: "We have people that call and do welfare checks and keep showing up to make it uncomfortable for them." This is pretty frightening, considering Frank has stated on social media that he has what Jordan refers to as "a cache of weapons including pistols and a loaded AR-15 rifle" in his RV. Couple this with the chillingly disturbing quote from Frank from a Facebook Live video, with which Jordan concludes her article: "We are building our little army. … So get ready."

Are Frank's actions illegal? Federal officials declined to comment for Jordan's article, but she did interview Margo Cowan, who she identified as "a public defender in Pima County, which includes Sasabe, and a longtime immigration activist." Said Cowan: "We believe the conduct of this group is illegal and extremely dangerous." According to Cowan, "the law require[s] those who find children alone to immediately contact a law enforcement officer."

Unfortunately, not all the law enforcement officers in the area are eager to get involved with Frank's antics. As noted in the *Times* article, "Chris Nanos, the sheriff of Pima County, called the 'QAnon types' at the border 'nut jobs' but said they were not his responsibility. … 'If they are interfering with migrants crossing, Border Patrol should deal with it,' he said, noting that he had a million people across 9,200 square miles to protect."

So sadly, many more migrant children will probably fall into Frank's hands—and the hands of others of his ilk. This is just one more example of how conspiracy theories are more than just silly ideas—they can be dangerous. If we really want to "save the children," people like Frank and his group of fellow vigilantes need to be taken seriously and dealt with by the law. ■

Julia Lavarnway is managing editor of Skeptical Inquirer.

Science Friction Documentary Released

Kenny Feder was interviewed for *Science Friction*.

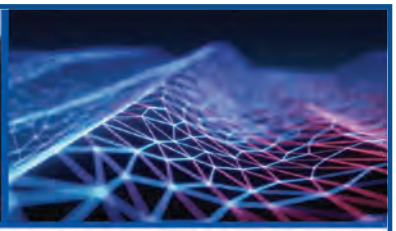
The long-gestating skeptical media literacy film *Science Friction* has recently been released. The documentary, produced by Brian Dunning (of *Skeptoid*) and directed by Emery Emery (*The Aristocrats*), exposes the truth about how science experts are mischaracterized in media.

Many people are aware that television documentaries often distort events and take experts out of context, but few realize the extent of it. *Science Friction* gives scientists a chance to clear the record. Experts interviewed include Matt Kirshen, Janine Krippner, Simon Singh, Jamy Ian Swiss, David S. Anderson, Banachek, Kenny Feder, Steven Novella, Michael Shermer, Richard Dawkins, ZDoggMD, and SI Deputy Editor Benjamin Radford. Each has a story to tell about how scientists and skeptics are misrepresented in news media and documentaries.

Often the reason for the deception is simply sensationalism, alarmism, and mystery mongering. Other times there's a more crass commercialism aspect (archaeologist Feder relates an all-too-familiar scenario of being pressured by producers to endorse pseudoscientific views on Atlantis) or a religious agenda (Dawkins describes being interviewed under false pretenses—and his footage being deceptively edited by—creationists including Ben Stein for his film *Expelled*). Dr. Novella describes his fruitless attempts at trying to give science-based information on alternative medicine to a condescending and disingenuous Dr. Oz, while Shermer gives behind-the-scenes insight into how he explained a psychic's abilities on a TV show—in footage left on the cutting room floor. From *Mermaids: The Body Found* to *Strange Evidence*, the film offers a wide cross-section of media deception.

The film, which was privately funded and released through Skeptoid Media, is now available to rent or buy on Amazon Prime and also on Tubi (with commercials). For more information visit https://sciencefriction.tv/. ■

SCIENCE AND THE PUBLIC



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How to Be a Skeptic in Russia

What has life been like for skeptics in Russia since its invasion of Ukraine? Three Russian skeptics talk about the fear and repression that dominate their lives.

PAVEL ŠMEJKAL

Vladimir Putin and his invasion of Ukraine permeates the entirety of Russian society. It is dividing friends and families and silencing its critics with legislative changes. Propaganda about the rotten West and the heroic fight against fascism attack people's minds on a daily basis. Is there still skepticism in Russia?

Общество скептиков (the Russian Skeptics Society) is known for the wide range of skeptical topics it has covered since 2013 and for not being afraid to discuss politics and religion—from a scientific perspective, of course. However, the Skeptics Society is currently, in the words of several of its members, "frozen." There is an online group on several social media sites, but it produces almost no new material and holds no events. This was initially a result of the COVID-19 pandemic, but now it is because it is prevented by the state apparatus itself. In March 2022, its Russian Wikipedia page was even deleted. Nevertheless, the main members of the group are in contact, and all of them hope that one day the association will be able to resume its activities.

One member of the Skeptics Society, "Eugene," became aware of scientific skepticism about fifteen years ago. He became active in its popularization five years later and is now in charge of coordinating the activities of the Skeptics Society in his hometown. Prior to the pandemic, he gave lectures, conducted training and games, and gave interviews. Together with colleagues from the community, he organized several Skeptikons. Eugene contacted two of his colleagues for their thoughts on what life is like for skeptics in today's Russia. Thanks to him, we now have the opportunity to look at the situation in Russia through the eyes of three members of Общество скептиков: "Vladimir," the coordinator of the Skeptics Society who creates popular science videos about history on YouTube; "Alexander," a young working mathematician at a scientific institute in the Urals and member of the Skeptics Society who occasionally creates popular science videos on YouTube; and Eugene himself, an entrepreneur and IT engineer.

'Vladimir'

Of course, a skeptic in modern Russia can function somehow. You can go to work, meet with friends. But to publicly declare that you are against the war is now almost impossible. As of late, such statements are a risk. At best, you will be called a traitor. At worst,

Alexei Navalny. Credit: Gregory Stein / Shutterstock

you'll be imprisoned for discrediting, and making false claims about, the Russian army.

Every year Putin's regime has affected life more and more. Until a few years ago, a person could do almost anything as long as he did not try to make his way in politics. But now it has become important to the state that people not only stay out of it but actively support what is happening. The country went from being an informational autocracy to a totalitarian dictatorship in a matter of months.

However, the existence of critical thinking does not depend on the political system. The problem is that freethought is a marginal movement in Russia. It is hard to talk about any support for science and critical thinking when the power in the country belongs to crazy, inhuman conspiracy theorists. There are such people in every country, but almost nowhere else do they have such power—or, as in the case of Donald Trump, the system of checks and balances prevents them from doing anything too stupid. In Russia, Putin has no deterrents. He is just a senile old man who doesn't know how to use the internet, who knows nothing about the modern world—but who has access to nuclear arms. And then there's his obedient police and the strongest propaganda.

I don't think my family would be in danger if I were incarcerated. So far, in Russia, cases against relatives of critics of the government have been isolated. But still, there have been several such cases. For example, there have been criminal cases against Alexei Navalny's brother, Lyubov Sobol's husband, and Ivan Zhdanov's father.

The exodus of the intelligentsia is underway, certainly. But there have been many such waves of emigration in Russian history, because the overall population has always spit on the intelligentsia. People gladly use the slogan "If you don't like Russia, get out of the country!" because the notions of "state" and "country" are firmly bound together. If you are against Putin, then you are against the country. And if you are against the country, then you are a traitor.

As for the "exodus of the elites," there is no such thing. In Russia, elites are usually defined as people who make decisions, such as ministers, deputies, and oligarchs. And only a few have spoken out for peace; most of them show full support for the president. They may not mean it sincerely; they do it because they are worried about their positions. Only former Deputy Prime Minister Arkady Dvorkovich spoke out openly. And the very next day, he was stripped of all his posts and branded a traitor to Russia. On the very first day of the war, I considered the possibility of emigrating, and today I am no longer in Russia.

The future of Russia is unclear. It is impossible to make any predictions. Now there is a breakdown of the system in which Russia has existed for the past ten years. My guess is that it will only get worse from here. Repression will intensify and the population will rapidly become poorer, but the propaganda—just like in the USSR—will tell people that "things are even worse in the West! Gay Nazis are beating up ordinary people, and the stores are empty." The situation will only change dramatically if Putin leaves power, most likely when he simply dies of old age. I would not count on a revolution or coup d'état. And what will happen next, nobody knows.

All I can say to the readers of Skeptical Inquirer is don't fall into the sin of collective responsibility. Putin is a dictator. He is not the embodiment of all Russians and all things Russian. He is merely a man with limitless power and the twisted mindset of an old man. There are many people in Russia who do not support the war.

'Alexander'

How—and even if—a skeptic can work in the new Russia is not yet clear. Recently (approximately since the hiatus of Vladimir Vladimirovich's rule), one way or another the degree of "censorship" and "banning" has been increasing. Until recently, it seemed the state was not interested in skepticism. After the adoption of the Act on Educational Activities (see sidebar), it has apparently decided to take control of this activity. And recent events (e.g., the rapid adoption of ever-stricter laws) have forced us to remain silent even when we would like to say something. We are left with the ability to offer only vague and veiled statements.

Opinions on the current situation vary depending on the generation. I think that, in general, everyone is shocked. The country's actions are supported mainly by the older generation, but I have the feeling that they had been brainwashed with basically two statements—about Nazis in Ukraine and about the threat of nuclear weapons. The younger generation, in my opinion, is for the most part categorically against the war—and depressed. People are free to talk to each other, and they do so. But most people are only willing to argue and shout at each other. Of course, many people, including me, are considering emigrating. Unfortunately, many just don't have the means or op-

portunity to do so.

'Eugene'

People who champion critical thinking have a hard time in Russia now. The authorities are simply fighting anyone who disagrees with them. Even before the war started, the number of deaths from COVID-19 was kept secret. The news said everything was fine and advertised worthless drugs. Now it is dangerous not only to express disagreement but even to express doubt.

Contemporary Russia is a state of power structures and corruption. From opening one's own business to holding public events, any activity is monitored by the state. I have witnessed the cancellation of several popular science lectures because their topics didn't appeal to someone "upstairs."

Since the days of the USSR, people in Russia are used to thinking one thing, saying another, and doing another. Therefore, it is almost impossible to guess what anyone is actually thinking. People support the ruling power out of fear, and then in the safety of their homes say they are against it. Of course critical thinking still exists in Russia, and many groups and communities in chats and meetings continue their work. If you touch on politics, economics, or any topics that are related to criticism of the current authorities, you are in danger. If I were to go to prison, my family would be in a very difficult situation; my wife works in a state organization, and she would immediately lose her job and be left without a livelihood.

That is why we are currently actively looking for emigration options. We want a better world for our children and are also very tired of the fear and the silence.

What the future of Russia will be I cannot say. It is bright in my dreams, but in reality these dark times may last for a long time, maybe ten or fifteen years.

I would like to wish for all the readers of Skeptical Inquirer that fear will never invade your homes. Cherish the freedom to think critically, study, and pass on your knowledge. And hold on to each other, because in difficult times, the most precious thing is friends.

***

We can only hope that the Russian Skeptics Society will resume its activities, that its members will once again regularly meet each other and be able to travel freely, that they will be able to continue the skeptical activism that is so badly needed in Russia—and that one dictator's madness will soon end. ■

Pavel Šmejkal is a chairman of Atropos Skeptics Society and a member of Czech Skeptics Club Sisyfos as well as of Guerrilla Skepticism on Wikipedia. He is also host of the *Meaning of (Skeptical) Life* podcast. His website in English is at blog.mosl.cz.

The Act on Educational Activities

In November 2020, Russian lawmakers warned of "the uncontrolled dissemination of scientific knowledge." A group of lawmakers and senators, led by Andrei Klimov, chairman of the Federation Council's Commission for the Protection of State Sovereignty, and Vasily Piskarev, chairman of the Duma Committee on Security and Anti-Corruption, submitted a draft of the Act on Educational Activities to the Duma. The authors of the document proposed that the Ministry of Education and Science be given the authority to license educational projects and that special attention be paid to cooperation between educational institutions and international organizations.

The proposal was opposed by the broad academic community. The presidium of the Russian Academy of Sciences stated that the adoption of the law "will lead to the lagging behind of our country in critically important areas of science and technology." According to cosmonautics popularizer Alexander Khokhlov, "The bill is very unspecific and leaves all initiative to the ministries. From now on everything will be regulated by regulations; they will do whatever they want." According to bioinformatician Mikhail Gelfand, the law is so "badly written" that its consistent application is impossible, and its selective application threatens to penalize all those engaged in educational activities.

But Senator Andrei Klimov rejects all criticism of the law:

> The scientific community is very broad. I, too, am a doctor of science. The concept is actually very simple—to introduce a definition of educational activity and allow the government to regulate it. ISIS is banned in Russia, and there are many structures that develop activities in a similar format, but they are not on the banned list. They also believe that they are involved in education, but we cannot stop them by direct, clear, and transparent means. This is not about university professors but about our real lives.

According to his information, he says the negative reaction to the initiative "is definitely not coming from Russia."

Putin signed the Act in April 2021. Since then, it has been virtually impossible to hold any lectures in public institutions and buildings without a license, and podcasts, webinars, and lectures on YouTube have disappeared.

The German *Heilpraktiker*: A Relic of the Past

EDZARD ERNST

The *Heilpraktiker* (translated literally as *healing practitioner*) is an officially recognized healthcare professional practicing so-called alternative medicine (SCAM) in Germany. The profession is seen as exemplary by many proponents of SCAM, while others feel that it presents an unacceptable danger to health and progress. The *Heilpraktiker* might be perhaps best understood by looking at its fascinating history (Ernst 1997).

When the Nazis came to power in 1933, German healthcare was inundated by lay practitioners who were grouped into multiple organizations vying for official recognition. Many of the Nazis were in favor of SCAM (e.g., Himmler and Hess) and felt the need to restructure German healthcare to bring it under their control. They promoted their concept of *Neue Deutsche Heilkunde* (New German Medicine), which entailed the integration—more of a shotgun marriage—of conventional medicine and SCAM (Ernst 2001).

The "flag ship" of the *Neue Deutsche Heilkunde* was the Rudolf Hess Krankenhaus in Dresden, which attempted a full integration of SCAM into conventional healthcare. An intriguing example of research into SCAM is the Nazi government's large-scale project to validate homoeopathy. Even though the data are now lost, the results of this research seem to have been negative. It seems hard to ignore the intriguing similarities between today's integrative medicine and the *Neue Deutsche Heilkunde* of the Third Reich (Ernst 2001). The Nazis decided to grant all SCAM practitioners the official recognition they craved by establishing them under the newly created umbrella of *Heilpraktiker*. But, not least to appease the medical profession, they also decreed that the *Heilpraktiker* was barred from educating a second generation of this profession. The *Heilpraktiker* was thus destined to become extinct within just a few decades.

After the war, the *Heilpraktiker* organization went to court and won the right to educate its own students. For this reason, the profession has survived to the present day. Around 50,000 *Heilpraktiker* currently treat patients with SCAMs such as homeopathy, acupuncture, herbal medicine, energetic healing, etc. Even today, the *Heilpraktiker* has no mandatory medical training; a simple test to show that they know the legal limits of their profession

suffices for receiving an almost unrestricted license to practice medicine. The *Heilpraktiker* can employ, largely without control, the whole spectrum of medicine, except for gynecology, dentistry, prescription of medication, and the treatment of infectious diseases (Heudorf et al. 2010). When struck off the medical register for practicing quackery, some German medical doctors carry on as *Heilpraktiker*, enjoying the absence of scrutiny over this profession (Ernst 2016b). Unsurprisingly, reports of *Heilpraktiker* causing serious harm emerge regularly (Ernst 2016a).

Heilpraktiker are known to advise against using conventional treatments, including vaccinations. One *Heilpraktiker* school, for instance, offers the following information about "homeopathic vaccinations" called nosodes (my translation):

> The *Heilpraktiker* is legally authorized to prepare the nosodes of medium potency (>D12) himself and to give them to the patient. This method, by the way, corresponds much better to the original approach of this very effective therapy, because the pathogen (the pathogen composition) in the nosode is identical with the causative agent of the clinical picture, and homeopathy, which cures like with like (or their oscillation patterns), can develop its full effect. In order to avoid legal problems, the nosodes themselves should not be itemized on the bill. (Nosodentherapie, Impfen mit Homöopathie 2009)

Most German medical doctors have no confidence in the competence of the *Heilpraktiker* and see little reason for cooperation (Thanner et al. 2013). Many are concerned about the harm the *Heilpraktiker* might cause, and several attempts to change the situation have been made. However, so far, none of them has been successful. In 2017, a group of German scientists, clinicians, ethicists, and other experts (I was a member of the panel) published a document critically assessing the situation and calling for change (Anlauf et al. 2017). Here are its conclusions (my translation):

> Parallel medical worlds with radically divergent quality standards, such as currently exist in the German health system in the form of double standards in the evaluation of results and quality control, are unacceptable for an enlightened society. In the case of nonmedical practitioners, due to their inadequate, barely regulated training, there is a glaring disproportion between qualifications and powers to practice. *Heilpraktiker* offer alternative or complementary medical procedures that are in most cases scientifically untenable. This puts patients at risk. Only a simultaneous approach on several levels promises success:
> (1.) a uniform assessment of patient utility in all areas of medicine;
> (2.) an increased commitment to the requirements of successful communication with patients;
> (3.) an increased promotion of competences in scientific theory in education and studies of health-related professions; and
> (4.) an abolition of the *Heilpraktiker* system or a radical raising and ensuring the level of competence of the *Heilpraktiker*.
> We have focused here on the reform of the *Heilpraktiker* system and have outlined two proposed solutions: We recommend either the complete abolition of the *Heilpraktiker* profession or its replacement by the introduction of specialized *Heilpraktiker* as an additional qualification for existing health professions. For the transitional phase, we recommend a legal restriction of the *Heilpraktiker* profession to largely nonhazardous activities. This would reduce the dangers for patients and significantly improve patient care in the long term.

Because *Heilpraktiker* tend to advise their patients against vaccinations, the current pandemic has brought the *Heilpraktiker* profession back in focus. The German newspaper *Die Zeit* recently reported about the dire state of the pandemic in some German regions (Vooren 2021). In one district, for instance, only about 58 percent of the population were fully vaccinated, far below the German average. The article blamed a distrust in conventional medicine, the media, and politics for this situation and pointed out that the higher the density of *Heilpraktiker*, the lower the uptake of immunizations.

The *Heilpraktiker* is a relic from Germany's Nazi past. The profession endangers the health of those who rely on it, and the sooner this problem can be addressed, the better for public health in Germany. ■

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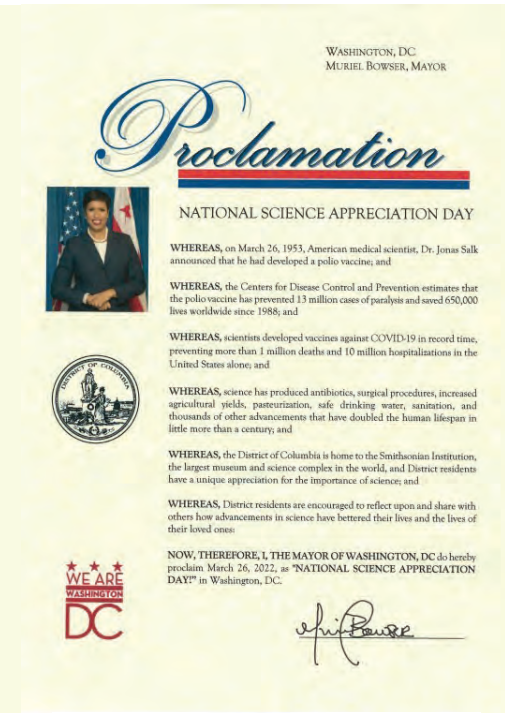
Edzard Ernst is emeritus professor at the University of Exeter in the United Kingdom.

[POSTCARDS FROM REALITY ROBYN E. BLUMNER

Robyn E. Blumner is president and CEO of the Center for Inquiry and executive director of the Richard Dawkins Foundation for Reason & Science. She is a lawyer who previously held posts as a syndicated columnist and editorial writer at the *Tampa Bay Times* and as executive director of the ACLU of Florida and ACLU of Utah.

Feeling Grateful for Science



WASHINGTON, DC
MURIEL BOWSER, MAYOR

Proclamation

NATIONAL SCIENCE APPRECIATION DAY

WHEREAS, on March 26, 1953, American medical scientist, Dr. Jonas Salk announced that he had developed a polio vaccine; and

WHEREAS, the Centers for Disease Control and Prevention estimates that the polio vaccine has prevented 13 million cases of paralysis and saved 650,000 lives worldwide since 1988; and

WHEREAS, scientists developed vaccines against COVID-19 in record time, preventing more than 1 million deaths and 10 million hospitalizations in the United States alone; and

WHEREAS, science has produced antibiotics, surgical procedures, increased agricultural yields, pasteurization, safe drinking water, sanitation, and thousands of other advancements that have doubled the human lifespan in little more than a century; and

WHEREAS, the District of Columbia is home to the Smithsonian Institution, the largest museum and science complex in the world, and District residents have a unique appreciation for the importance of science; and

WHEREAS, District residents are encouraged to reflect upon and share with others how advancements in science have bettered their lives and the lives of their loved ones:

NOW, THEREFORE, I, THE MAYOR OF WASHINGTON, DC do hereby proclaim March 26, 2022, as "NATIONAL SCIENCE APPRECIATION DAY!" in Washington, DC.

The State of New Hampshire
By His Excellency
Christopher T. Sununu, Governor

A Proclamation

In the year of our Lord Two Thousand and Twenty Two

SCIENCE APPRECIATION DAY
MARCH 26, 2022

WHEREAS, on March 26, 1953, American medical scientist, Dr. Jonas Salk, announced he had developed a vaccine against polio; and

WHEREAS, the CDC estimates the polio vaccine has prevented 13 million cases of paralysis and saved 650,000 lives worldwide since 1988; and

WHEREAS, science has brought humanity vaccines, antibiotics, surgery, sanitation, increased agricultural yields, pasteurization, safe drinking water, and thousands of other interventions that have doubled the human lifespan in little more than a century; and

WHEREAS, people have experienced longer and healthier lives, greater convenience and comfort, and enhanced prosperity due to the benefits of science; and

WHEREAS, citizens are encouraged to reflect on how scientific advances have bettered their lives and those of their loved ones, and show their appreciation for people in the fields of research, technology science education, and medicine;

***NOW, THEREFORE, I,* CHRISTOPHER T. SUNUNU, GOVERNOR** of the State of New Hampshire, do hereby proclaim **MARCH 26, 2022** as **SCIENCE APPRECIATION DAY** in the State of New Hampshire, and call this to the attention of all citizens.

IN TESTIMONY WHEREOF, I have hereunto set my hand and caused the Seal of the State of New Hampshire to be affixed this 1st day of March, 2022.

Christopher T. Sununu
Governor

State of North Carolina
ROY COOPER
GOVERNOR

NATIONAL SCIENCE APPRECIATION DAY
2022
BY THE GOVERNOR OF THE STATE OF NORTH CAROLINA
A PROCLAMATION

WHEREAS, on March 26, 1953, American medical scientist, Dr. Jonas Salk, announced he had developed a vaccine against polio; and

WHEREAS, the CDC estimates the polio vaccine has prevented 13 million cases of paralysis and saved 650,000 lives worldwide since 1988; and

WHEREAS, science has brought humanity vaccines, antibiotics, surgery, sanitation, increased agricultural yields, pasteurization, safe drinking water, and thousands of other interventions that have doubled the human lifespan in little more than a century; and

WHEREAS, people have experienced longer and healthier lives, greater convenience, and comfort due to the benefits of science; and

WHEREAS, the State of North Carolina invites residents to show their appreciation for technology, science education, and medicine researchers in North Carolina and beyond; and

WHEREAS, North Carolina residents are encouraged to reflect on and share how science advances have bettered their lives and those of their loved ones;

NOW, THEREFORE, I, ROY COOPER, Governor of the State of North Carolina, do hereby proclaim March 26, 2022, as **"NATIONAL SCIENCE APPRECIATION DAY"** in North Carolina, and commend its observance to all citizens.

Roy Cooper
Governor

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of North Carolina at the Capitol in Raleigh this twenty-third day of March in the year of our Lord two thousand and twenty-two and of the Independence of the United States of America the two hundred and forty-sixth.

The State of Maryland

Proclamation

From the Governor of the State of Maryland

NATIONAL SCIENCE APPRECIATION DAY
MARCH 26, 2022

WHEREAS, *On March 26, 1953, American medical scientist Dr. Jonas Salk, announced he had developed a vaccine against polio; and*

WHEREAS, *The CDC estimates the polio vaccine has prevented 13 million cases of paralysis and saved 650,000 lives worldwide since 1988; and*

WHEREAS, *Science has brought humanity vaccines, antibiotics, surgery, sanitation, increased agricultural yields, pasteurization, safe drinking water, and thousands of other interventions that have doubled the human lifespan in little more than a century; and*

WHEREAS, *People have experienced longer and healthier lives, greater convenience and comfort, and enhanced prosperity due to the benefits of science; and*

WHEREAS, *The State of Maryland invites residents to show their appreciation for our workers in the fields of research, technology, science education, and medicine; and*

WHEREAS, *Residents are encouraged to reflect on and share how science advances have bettered their lives and those of their loved ones;*

NOW, THEREFORE, I, LAWRENCE J. HOGAN, JR., GOVERNOR OF THE STATE OF MARYLAND, *do hereby proclaim MARCH 26, 2022 as NATIONAL SCIENCE APPRECIATION DAY in Maryland, and do commend this observance to all our citizens.*

March 26, 2022, was the first National Science Appreciation Day. It was on this day in 1953 that Jonas Salk announced the first successful trials of his polio vaccine.

Thirteen states (both red and blue states, I'm gratified to report) plus the District of Columbia issued declarations proclaiming March 26 National Science Appreciation Day, a project under the banner of ScienceSaves.

We started National Science Appreciation Day because science needs a champion. In the midst of the COVID-19 pandemic, when life-saving mRNA vaccines were developed with remarkable speed and soon demonstrated their safety and efficacy, many of us were blindsided by the fierce backlash against scientific expertise. The science of vaccinations took on a partisan veneer that defied all logic and rationality.

Vaccines were mostly attacked by people on the political right, with some notable exceptions—yes, I mean you, Robert F. Kennedy Jr. The extent of the anti-vax hysteria ranged from angry calls for "freedom" from vaccine mandates to completely insane claims about Bill Gates embedding microchips into people through vaccinations. There has always been a strong anti-science bent in the United States, especially in evangelical and fundamentalist circles (nearly 100 years after the Scopes Trial, we're still debating evolution!). But the level of distrust directed toward scientists, including Dr. Anthony Fauci, has broken a fundamental precept of the Enlightenment, which is that hard-earned expertise has objective value.

Meanwhile, the political left is not off scot-free. It has had its own

anti-science freakouts, including the cancellation of great scientists for being men of their time, for studying areas of science that connect genes to behaviors, or for having the audacity to be respectful colleagues of someone else who holds offensive views. Examples include the removal last year of Thomas Henry Huxley's name from Western Washington University's College of the Environment (Western Washington University 2021) and the ongoing hyperventilations against the late biologist E.O. Wilson (Coyne 2021)—both of whom were accused of being racists without convincing evidence.

National Science Appreciation Day and the entire ScienceSaves program was designed to come to the defense of science and remind people of how their lives are better, healthier, and longer due to the advances that the scientific method has wrought. This was the brainchild of Todd Stiefel, who is also generously funding the initiative through the Stiefel Freethought Foundation. It is an effort to reduce the partisan temperature around science and provide some perspective as to how this method of understanding reality has so well served all of us regardless of political stripe.

Here is an edited sampling of the many responses to the following tweet about National Science Appreciation Day by Richard Dawkins[1]:

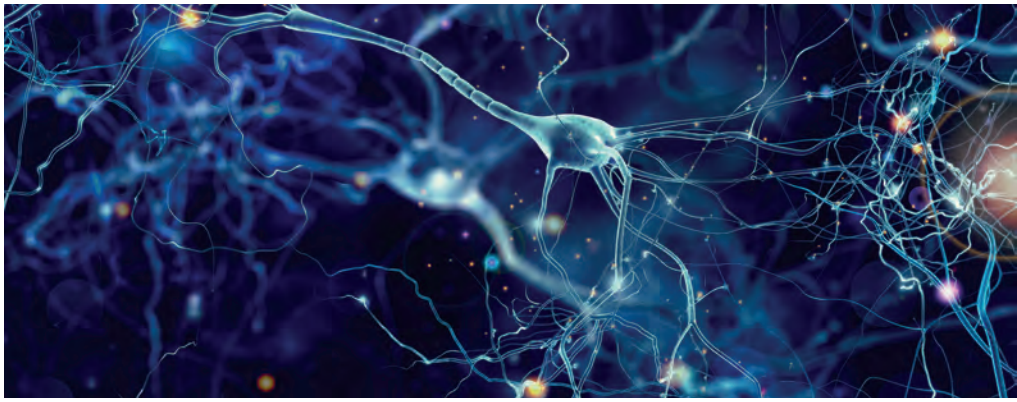
> Science has quite literally altered the trajectory of my life. It has created purpose for me in addition to saving my life as a child.
>
> I urge you on National #ScienceAppreciationDay to share how science has helped you or another.

Jesselyn Mason:

> I.V. antibiotics saved me from a severe case of pneumonia as a teenager. It also fixed my heart condition with an ablation. Pursuing a degree in science and deciding to achieve something in my life gave me the courage to escape an abusive situation.

Mads Rasmussen:

> My daughter has T1 diabetes. Thank you, science, for saving her life and making it possible for her to live an almost normal life!



Peter 'org0x7c00' Carruthers:

> The scientific method (and the scientific process and attitude) gives me a much longer life expectancy, water that won't make me ill, a computer to say this with, electric light, a perfect fix for my broken leg, and a surgeon who knew to wash his hands 1st!

Jacob Lawrence:

> My 17-year-old daughter had brain surgery last night to repair a shunt that saved her life when she was 7 months old. Last night the neurosurgeons showed my wife and me a photo of the 17-year-old shunt valve they just replaced. Thank you, science!
>
> In the 17 years since she got her shunt, science has progressed to make a remotely programmable, MRI-compatible shunt valve. We are thankful to live at a time that has allowed our daughter to live a good life. Our doctors expect her to recover and be off to college in the fall!

Ulla:

> Not only did science literally save me from dogma, but it prompted me to stop spouting the same BS as a parent and I instead made a deliberate effort to reward/encourage their curiosity & critical thinking. They are now studying to become a biologist.

Sr. Koello:

> The year was 2008. I was visiting the MIT bookstore, and as I entered, I saw this book right in front of me: *The God Delusion*. My life has never been the same. I watched your TED videos and some older recordings. I had no idea what scientific thinking was. Thank you, Mr. Dawkins.

We will be building on this campaign by offering college scholarships for the best thirty-second video on how science has saved the applicant or someone the applicant knows. And Bertha Vazquez, CFI's education director, has developed along with a team of educators eighteen different teaching modules for students of all grade levels highlighting the contributions of science and scientists to revolutions in medicine, agriculture, sanitation, and technology.

Yes, there are ways that science has gone wrong—climate change being the most salient example at the moment. The advanced scientific technologies that provide so much comfort and convenience also emit a damaging amount of greenhouse gases. But everyone knows that the answer to this crisis lies in science as well.

When people think of science, they should think of the polio vaccine or the James Webb Space Telescope and be awed, inspired, and grateful. The scientific method is our shared, bountiful inheritance. Without it, we would all be without a candle in the dark. ■

Note

1. Richard Dawkins's birthday is also on March 26. That was purely a happy coincidence and not part of the thinking when choosing that date to commemorate.

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[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell, PhD, is CSI's senior research fellow. A former stage magician, private detective, and scholar, he has—since 1969—investigated numerous "strange" and unsolved mysteries, many of them celebrated cases.

Unmasking a Monster: My Role as a Nazi Hunter

Among cases that are found at the margin of the "strange" genre (and so are often included in lists of *paranormal* phenomena) are varying types of "hidden identity," which present varying degrees of difficulty to expose.

Some whimsical impostures are inadvertently exposed. For instance, young Deborah Sampson (1760–1827), prompted by a desire for adventure, assumed a false identity as Private Robert Shurtleff and served bravely for a year and a half in the Continental Army until she was hospitalized with a fever, which resulted in her unmasking. Honorably discharged, she soon married, raised three children, and published a narrative of her life, *The Female Review*, in 1797 (Nickell 2005, 34).

Again, stage magician William Ellsworth Robinson (1861–1918) sought to capitalize on the popularity of a Chinese conjurer who had toured America. Adopting a similar name, "Chung Ling Soo," and donning appropriate costume and makeup, he entertained western audiences with his oriental-style wizardry for eighteen years—even maintaining his disguise offstage and speaking to reporters only through an interpreter. His imposture was tragically revealed: he was mortally wounded while performing magic's notorious "Bullet-Catching Trick." Doctors attempting to save his life discovered that his skin coloring did not extend below the neck or above the forearms (Nickell 2005, 34)!

Among my most significant cases was that of accused Nazi death camp guard Ivan "John" Demjanjuk. The question of the authenticity of an SS identification card photo (see Figure 1) was a life-or-death one when I was brought into the case by his desperate family. He had been sentenced to be executed in Israel, having been convicted of being the notorious "Ivan the Terrible" at the Treblinka concentration camp.

Figure 1. Nazi death camp guard Ivan "John" Demjanjuk's SS identification card photo. Photo Credit: Getty Images / Staff.

Many 'Ivans'

In Poland, east of Warsaw, the Nazis operated a group of camps for the extermination of Jews—Belzec, Treblinka, and Sobibor—together with an SS facility, Trawniki, where death camp guards were trained. Most of the guards were Ukrainian prisoners of war who volunteered for the grisly work. One such member of the Trawniki unit was a brawny twenty-two-year-old motor mechanic and driver named Ivan Demjanjuk (Nickell 2005, 38).

There were, however, various men named Ivan in the unit, and they were shifted from camp to camp. As Harvard law professor Alan Dershowitz explains:

> Back in 1987, after attending several sessions of the Demjanjuk trial in Jerusalem, I publicly stated that

> I would not be surprised if there were several Ivan the Terribles at Treblinka. Most of the guards at Treblinka were Ukrainians, and Ivan—Ukrainian for John—is the most common Ukrainian name. Any brutal guard named Ivan would be called Ivan the Terrible. (Dershowitz 1991)

Indeed, Treblinka survivor Yehiel Reichman testified, as Demjanjuk's defense attorneys had argued, that there were no fewer than six Ivans at Treblinka, where the man dubbed "Ivan Grozny," or "Ivan the Terrible," was stationed. Some said that Ivan Grozny was a ranking officer; others said he was a train driver or watchtower guard. The greatest number, though, said that he was the sadistic guard who operated the gas chamber motor and who took delight in hacking off an ear or breast or splitting skulls with an iron pipe that he brandished (Teicholz 1990, 29, 120, 277, 278; Nickell 2005, 38).

Adding to the uncertainty surrounding the many Ivans, Demjanjuk's defense attorney attempted to make a case that a Nazi criminal named Alfred Blitz had been at Treblinka from June 1942 to September 1943, had committed acts like those eyewitnesses attributed to Ivan the Terrible, and was even called Ivan. To the Jews forced to work at Treblinka, the true names of the various Ivans would not have been known, and in their uniforms, many of the Ukrainians may have looked alike. A further difficulty stems from the fact that the so-called work-Jews at Treblinka were not permitted to look into Ivan's eyes (Teicholz 1990, 11, 121, 207; Ryan 1984, 101).

In the case of Demjanjuk, what is known is that he lied about his Nazi past upon immigrating to the United States and repeatedly gave what the Associated Press termed "contradictions in his testimony about his whereabouts during the war" ("Defense" 1987). An American judge who, on June 30, 1993, upheld Demjanjuk's 1986 deportation from the United States, said:

> Mr. Demjanjuk's alibi was so incredible as to legitimately raise the suspicions of his prosecutors that he lied about everything—including his denial that he was Ivan the Terrible. The principal effect of his lie … was merely to confirm the prosecutors' suspicions that they were on the right track. ("Deportation" 1993)

Nazi ID card

Although I would actually come to find further evidence of Demjanjuk's guilt, he was finally acquitted in 1993 by the Israeli Supreme Court as a result of newly discovered evidence. Statements by former Treblinka death camp guards had been discovered, wherein each man—interrogated by the Soviet KGB and convicted of war crimes—claimed that Ivan the Terrible was not Ivan "John" Demjanjuk but one Ivan Marchenko. Yet even this evidence proved less credible than it first appeared. Meanwhile, at one point Alan Dershowitz remarked that Demjanjuk was "Ivan the Less Terrible."

The unrefuted evidence against Demjanjuk remained powerful. It included his positive identification by a fellow guard at the Sobibor death camp and documentary evidence placing him as a guard at two other camps (though not at Treblinka). Demjanjuk also admitted to having had an SS tattoo removed, with no credible explanation of why he had such a tattoo in the first place (Nickell 2005, 39). The most incriminating evidence, however, was an SS identification card bearing his apparent photograph and signature. But was the card authentic?

In 1987, I assembled a team of experts to compare the questioned photo with known photographs of Demjanjuk (e.g., from a 1947 driver's license) using a variety of approaches. Forensic analyst John F. Fischer applied a superimposition technique; forensic anthropologist Virginia Smith found similar skull structures, including a similarly enlarged right orbit (eye socket); and ear expert Alfred V. Iannarelli concluded that the ears in the questioned and known photos matched. (Our other experts also agreed on additional specific points of matching [Nickell 2005, 42–44].)

The questioned photograph was also determined to lack any signs of alteration—either evidence of photographic retouching or tampering with the facial features or the clothing. Our forensic review additionally supported the previous detailed study conducted for the Israeli prosecution using measurements of eleven facial landmarks (Nickell 1994, 90–96).

My Testimony

Other evidence supported the matching photographs. The signatures on the card were authentic (as determined by expert examination), and the information on the card was corroborated by other documents. Importantly, the card precisely matched genuine SS identity cards. I was able to match the questioned Demjanjuk card to other such cards for other guards in terms of having identical printing flaws. Again, other experts showed further import-

ant matching—for example, its typewritten portions having been done on a 1930-series Olympia 12 machine, as on other cards (Nickell 2005, 46).

Although Demjanjuk's family understandably dropped my service, my work on the case enhanced my profile, especially among document experts. Two who had testified in the case in Israel were kind enough to invite me to their laboratories in Washington, D.C.: Dr. Antonio Cantu of the U.S. Secret Service and Gideon Epstein of the Bureau of Immigration and Naturalization. I recall Cantu showing me that the Secret Service had acquired my book *Pen, Ink and Evidence* for their library, and he and I subsequently kept in touch on some other matters.

This was also true of Epstein, and it helped lead to my further involvement in the case. In 2000, I was visited by two agents from the U.S. Office of Special Investigations (OSI), and they brought greetings from Epstein, whom I deduced had recommended me. I was happy to share my files. (Indeed, I had a videotape of Demjanjuk in his Israeli jail cell that the OSI had been unable to obtain. I let them take it to make a copy, and they soon returned it.)

The OSI agents took down my testimony regarding my findings in the case. This would be part of a new trial in the United States—not for Demjanjuk's war crimes but to revoke his citizenship for having lied about his Nazi past upon entering the country. My resulting affidavit of October 5, 2000, was for the United States District Court for the Northern Division of Ohio, Eastern Division. That trial was held in 2001. On February 21, 2002, the federal judge revoked the eighty-one-year-old Demjanjuk's United States citizenship. He was subsequently deported to Germany (Nickell 2005, 50).

The Final Trial

Demjanjuk was tried and convicted of war crimes—specifically 27,900 counts of accessory to murder. On May 12, 2011, he was sentenced to five years in prison with credit for two years served. He was released from custody pending appeal but then died at a home for the elderly on March 17, 2012. Because he died before his appeal was heard, he is presumed not guilty under German law ("John Demjanjuk" 2022).

That technicality notwithstanding, it is clear that Demjanjuk was one of the Nazi SS's roving Ivan the Terribles. At the very least—even if one does not accept the evidence that he was among the Ivans of Treblinka—he was certainly Ivan the Bloody of Sobibor.

With him showing not a hint of contrition or willingness to admit wrongdoing, it is important to remember the overwhelming evidence: the best that could be said in Demjanjuk's defense is that he was innocent of killing Jews at one death camp because he was participating in killing Jews at another. ■

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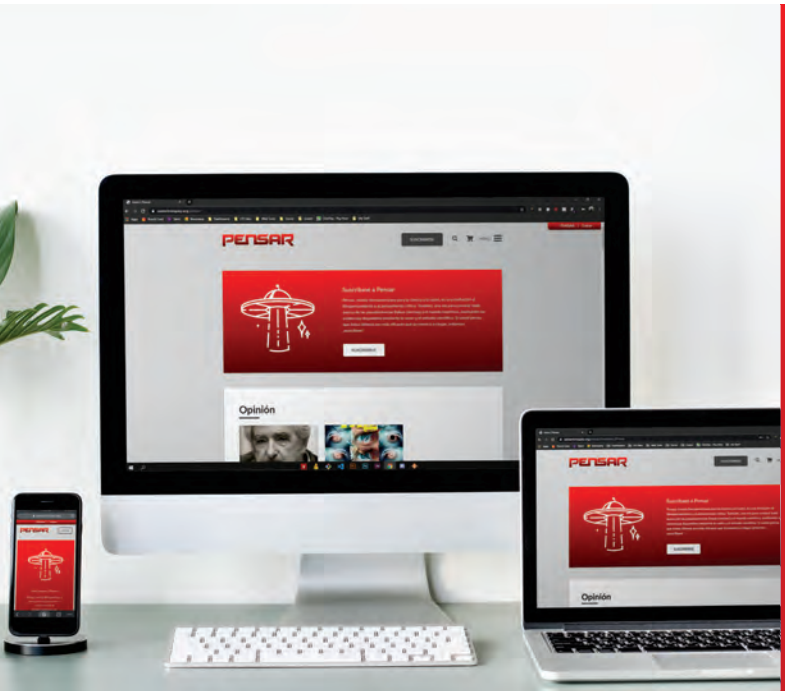

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[THE PHILOSOPHER'S CORNER MASSIMO PIGLIUCCI

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What Does It Mean to 'Interpret' Quantum Mechanics?

When I wear my hat as a philosopher of science (partially distinct from my other hat as an evolutionary biologist), I eventually run into a scientist (I could name names, but I won't) who smugly tells me that philosophy obviously doesn't make progress. The evidence? Philosophers disagree on all sorts of things and there is no emerging consensus—unlike in science, especially physics.

Setting aside that this kind of reasoning largely reflects ignorance of how philosophy works (surprise—it's different from science!; see Pigliucci 2017), it turns out that there is at least one area of science where things appear to be characterized by utter confusion and lack of consensus: interpretations of quantum mechanics. And we have the empirical evidence to prove it.

Sujeevan Sivasundaram and Kristian Hvidtfelt Nielsen, of Aarhus University in Denmark, carried out a study of physicists' attitudes concerning foundational issues in quantum mechanics (Sivasundaram and Nielsen 2016). The results are eye-opening. The survey is based on 149 responses to a questionnaire that the authors sent to 1,234 physicists affiliated with eight universities.

One obvious question posed by Sivasundaram and Nielsen was whether physicists need an interpretation of quantum mechanics in the first place. After all, quantum mechanics is a mathematical theory, and it does an incredibly accurate job of predicting the results of experiments. What else is needed? If your answer is "nothing," then you belong to the infamous "shut up and calculate" school of thought. It's comprised of physicists who think that it's a waste of time to try to attach physical interpretations to the equations: the math is all there is, the rest is a waste of time. Philosophy, if you will.

The fact is, Sivasundaram and Nielsen's results show that the shut up and calculate school is in the minority, at only 23 percent. By contrast, 65 percent of surveyed physicists responded that it's important to arrive at a physical interpretation because it helps us understand how nature works. This difference of opinion reflects a more fundamental contrast between two attitudes about the nature of science itself. On the one hand, we have what philosophers of science call "anti-realists," meaning people who think science is not in the business of arriving at truths about the world but can only produce empirically adequate models. The shut up and calculate people belong to this group, whether they realize it or not. The realists, by contrast, think that the whole point of science is to produce true statements about how the world actually works, so they are never going to be satisfied with just mathematical models—no matter how phenomenally accurate.

Naturally, Sivasundaram and Nielsen then asked physicists what their favorite interpretation of quantum mechanics happens to be, considering there is a large field of choices available (Lewis 2022). The responses were all over the place: 36 percent answered that they have no favorite interpretation; 39 percent preferred the Copenhagen one; 6 percent the many worlds; another 6 percent the information-theoretical; 3 percent went for a statistical interpretation; 2 percent each for De Broglie-Bohm and objective collapse; 1 percent each for modal interpretation, quantum Bayesianism, and consistent histories. The other 7 percent fell under

"not sure" or "other." Not only is there no consensus, but one may be forgiven for having assumed that the many worlds interpretation is all the rage—at least given the coverage it has gotten in recent years because of one very prominent physicist (Sean Carroll) pushing it in the public sphere.

Sivasundaram and Nielsen also wanted to know whether people change their minds about their favorite interpretation. Setting aside the 40 percent who claimed not to have a favorite, 38 percent responded "never," 11 percent "once," and 12 percent "several times." The issue, it seems, is far from being settled. Indeed, one might wonder on what basis a physicist would change his or her mind about this or arrive at a particular conclusion in the first place. After all, the various interpretations are empirically equivalent, meaning that they all make exactly the same predictions about observable phenomena. Let that sink in: *there is no way to empirically tell apart different interpretations of quantum mechanics*. One might even suspect that this isn't really science. It smells more like … metaphysics!

But perhaps physicists agree on more specific questions concerning quantum mechanics. For example, we often hear that the theory says that physical events are, at the fundamental level, random. Are they? It depends on whom you ask. While 67 percent of respondents agreed with the statement that randomness is a fundamental concept in nature, 12 percent thought that randomness is only apparent. Eighteen percent said that randomness cannot be removed from any physical theory, while 4 percent thought that the universe is, at bottom, deterministic, though we just haven't gotten to the point of proving it yet.

Another thing you often hear about quantum mechanics is that it shows that objects as we understand and perceive them don't have their properties prior to measurement. The most famous conceptualization of this notion is Schrödinger's cat, which is both alive and dead until someone opens and looks into the infamous box in which the cat is located. Forty-seven percent of surveyed physicists agreed with this picture, but 38 percent did not. (The other 15 percent fell under "not sure" or "other.") So which one is it? Cat lovers want to know.

Sometimes, instead of "measurements" physicists talk of the "observer" fixing the properties of objects, thus unwittingly lending apparent credence to all sorts of Deepak Chopra–style nonsense about the role of consciousness in the cosmos. But it turns out that professional opinion is divided here too. Thirty-seven percent of physicists who returned the survey said that the observer is a complex quantum system, 31 percent that it plays a fundamental role in quantum formalism but no distinguished physical role, 22 percent that it does play a distinguished physical role, and 10 percent that it plays no fundamental role at all.

One of my favorite questions, because it again strikes at the core of what physicists think about the nature of science, was "if two physical theories give the same predictions, what properties would make you support one over the other?" A whopping 87 percent picked simplicity, that is, the famous Occam's razor. But theoretical physicist Sabine Hossenfelder has written an entire book to explain to her colleagues that simplicity, beauty, and other nonempirical criteria are simply not reliable guides to truth (Hossenfelder 2020). Plenty of simple and/or beautiful theories have been favored in the past and are now piling up in the garbage dump of the history of science.

And here is another fascinating insight from the survey conducted by Sivasundaram and Nielsen: apparently, a good number of physicists don't know what they are talking about when it comes to quantum mechanics, which only reinforces their colleague Richard Feynman's famous quip that if you think you understand quantum mechanics, you probably don't. When asked what characterizes the Copenhagen interpretation, which is the oldest and most famous of them all, the responses were all over the place—including places that were mutually exclusive! And in fact, similar results were obtained when Sivasundaram and Nielsen asked the same question about the many-worlds interpretation.

I don't mean to make (too much) fun of my colleagues in physics. But I do mean to make a couple of serious points. First, there is significant disagreement about the nature of science *among professional scientists*. Second, physicists are at odds with each other about several fundamental questions in their field. Reflecting on these two observations ought to invite us to practice a bit of humility whenever we are tempted to confidently talk about *the* scientific method, *the* nature of science, and *the* scientific view of the world.

As philosophers of science have been arguing for a while now, there is no single scientific method; the nature of science is complex and difficult to pin down. As a result, the scientific view of the world shifts all the time. This complexity and instability, however, are not bugs; they are features. Understanding the world on the basis of empirical evidence—which is what science is in the business of doing—is a hard job fraught with perils. It is arguably a miracle (in the secular sense of the term) that we do know so much about what goes on at both the cosmological and the fundamental scales of reality, given how far they are from our day-to-day experiences.

Einstein famously said that the whole of science is nothing more than a refinement of everyday thinking. If that's true, it is a hell of a refinement. The current state of affairs in quantum mechanics seems to me to indicate that Einstein, for once, didn't get it right. ■

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[REALITY IS THE BEST MEDICINE HARRIET HALL

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Medical Tests to Avoid

When I first started looking into chiropractic, I read about one of its continuing medical education (CME) offerings. CME for physicians is intended to update their knowledge so they can treat patients more effectively. This chiropractic CME course didn't try to inform chiropractors about new knowledge from recent studies (there isn't much new chiropractic research) or tell them which chiropractic techniques worked better than others (they don't know and don't care; they just want to be able to use whichever one they choose). Instead, it was all about practical business tips for building their practices.

I was intrigued by their advice for building a pediatric practice: Chiropractors were taught how to destroy the parents' faith in their pediatrician. Good acting skills were helpful. Chiropractors were supposed to examine the child, act concerned as if they had discovered some serious problem, and ask the mother which side the child had preferred for breast feeding. Whatever she answered, they were to act as if that confirmed their findings. (Of course it hadn't, because they hadn't found anything.) Then they were to say, "Did your pediatrician ever ask you that question?" Of course he didn't, because there was no reason to do so, just as there was no reason to ask if the child preferred broccoli to zucchini. The parents were led to believe chiropractors knew things that pediatricians didn't. This cynical exercise was intended to destroy faith in the pediatrician and persuade parents to switch from pediatric care to chiropractic care.

Some providers, especially so-called "functional medicine specialists," order a lot of nonstandard tests. I read a case report of an eighty-year-old woman with breast cancer who got a whopping 154 tests, including putrefactive single chain fatty acids, urine representativeness index, pancreatic elastase, lignoceric acid, and other similarly esoteric tests (Hall 2017). Some patients might lose faith in their own doctor and be led to wonder why he or she had not ordered those tests. The answer, of course, is that there is no earthly reason to do so. The doctor wouldn't have known what the results meant, what should be done to treat abnormal results when found, or whether the findings even required any action. The functional medicine specialist didn't know either but was happy to make things up, treating the patient with a laundry list of dietary supplements, a special diet, exercise with bicycle and qigong, a sleep program, and more.

Genetic Testing

In one of my early inquiries into questionable medical practices, I collaborated with Stephen Barrett for an article for Quackwatch on dubious genetic testing. We looked at several organizations that offered diet and lifestyle advice based on personal genomes. Our conclusion was that "Genetic testing to identify alleged risk factors that have no proven corrective measures is simply a waste of money" (Hall and Barrett 2008). We quoted a British genetics expert who said, "tailoring your diet to your genetic make-up is about as scientific as tailoring your diet to your star sign."

An addendum to our Quackwatch article was posted in 2008 with three updates:

1. The Government Accountability Office (GAO) conducted an undercover investigation during which they purchased genetic tests from four websites and submitted twelve DNA samples from a nine-month-old female and two samples from a forty-eight-year-old man. They provided fake descriptions of the people allegedly submitting the samples. The companies gave different advice for identical samples, and their predictions were "medically unproven, ambiguous, and provided no meaningful information for consumers" (Kutz 2006).

2. A 2006 systematic survey of websites promoting nutrigenomic services found that "Organizations did not provide adequate information about nutrigenomic services and at-home genetic testing" (Sterling 2008).

3. GeneWatch UK claimed that "genetic horoscopes" are a dangerous myth because "They are a bad strategy for health; They market fear; They undermine public health; They create a genetic underclass; They undermine civil liberties; They attempt to patent life; They waste resources and erode trust" (GeneWatch UK n.d.).

Sad to say, tests are still being offered that go way beyond the science. GenoPalate advertises a personalized DNA analysis that will allow you to "Eat for your genes." The unfortunate truth is that DNA analysis simply cannot inform a personalized health plan, and any company who says it can is not interested in your health, only your money.

Then came Theranos. Elizabeth Holmes committed fraud to become the world's youngest self-made female billionaire. Her machine was supposed to get 200 accurate blood tests in one minute from a single finger-stick. That's simply not possible. Her downfall was epic, inspiring books, podcasts, and movies. She was tried in federal court and found guilty of four counts of fraud and is currently out on $500,000 bail, awaiting sentencing in September 2022, which could result in her spending twenty years in prison.

At-home tests have started to spring up everywhere. The SmartJane test allows women to assess their own vaginal health by sending in a vaginal swab (Hall 2019). They get back a report with findings for fifty-five components of the vaginal microbiome. There was only one clinical study, and it failed to demonstrate any clinical benefits.

EverlyWell is my current pet peeve. I keep seeing ads for it on TV. A bright young woman optimistically sends off her sample ("It's easy!") with the confidence that it will accurately identify her food sensitivities so she won't have to do a food elimination test. Her confidence is badly misplaced. The test measures IgG, which is not a valid guide to food sensitivities. It has never been scientifically proven, and the American Academy of Allergy, Asthma, and Immunology calls it a myth. The Choosing Wisely campaign recommends against IgG testing for allergies. For a higher price, they add a saliva test for just five genes that they think affect metabolism and absorption of certain foods and nutrients. This test is also unreliable and not indicated.

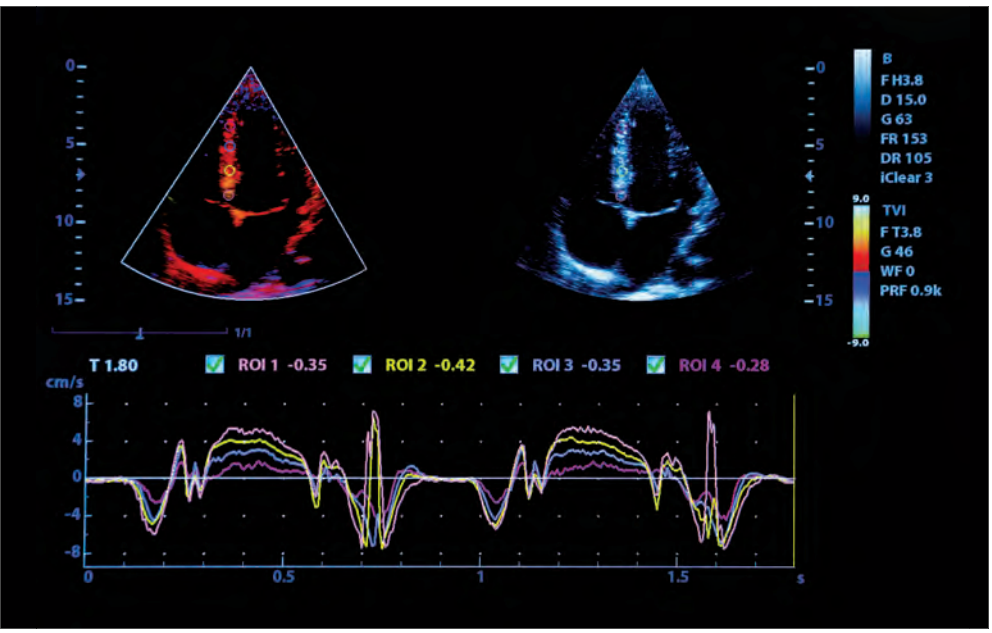
EverlyWell offers a total of thirty-four different do-it-yourself tests. Among them: heart health, breast milk DHA, sleep and stress test, heavy metals, STD tests for males, thyroid tests, and even a COVID-19 test. Because they are sold to everyone, they are essentially screening tests. That's a problem, because when testing an entire population, unless the prevalence of the condition is high, the number of false positives will exceed the number of true positives, making it useless as a screening test. These tests are *not* indicated for general consumption. Some of them are useful in people who have symptoms, but patients are always better off if directed testing is ordered by their own doctors.

Whole Body CT Screening

In the early twenty-first century, it was common to see ads for whole body CT scans at dedicated free-standing CT centers. They offered to examine your entire body to find everything that might be wrong. It sounded like a great idea. It wasn't; it was a bad idea all around. Screening with whole body CT scans had no benefits for healthy people and exposed them to dangerously high levels of radiation. It found what we call "incidentalomas," minor anomalies that are not a health risk for patients. Doctors were inundated by worried patients who brought in their CT reports and demanded that their doctors embark on a wild goose chase to explain or eliminate the findings with further diagnostic tests or procedures that were expensive, not indicated, invasive, and potentially even life-threatening. The FDA issued a warning (U.S. Food and Drug Administration 2017), and fortunately the fad now seems to have died out.

Ultrasound Screening

For many years now, companies have been offering ultrasound screening to the general public. Life Line claims to have screened over nine million patients over twenty-five years to determine their risk of stroke, cardiovascular disease, and other chronic illness. If normal, the tests may provide peace of mind. If abnormal, early detection may prevent problems. They quote the American Heart Association: "80% of stroke and heart disease can be preventable." Their $159 package uses ultrasound to screen for carotid artery plaque and abdominal aortic aneurysm and to measure bone density in the shin bone to assess the risk of osteoporosis. In addition to ultrasound, they include blood pressure readings in the extremities to detect peripheral artery disease, and a six-lead EKG to detect atrial fibrillation. Enthusiastic



testimonials claim that these screenings have saved lives. Life Line sets up clinics at local service organizations and churches, implying endorsements to give them extra cachet. Currently, I am offered several options within eleven miles of my home: two Baptist churches, a Bible Chapel, a VFW post, a fire station, and the Fraternal Order of Eagles.

All this is very misleading. The only way to know if Life Line screening saves lives or prevents heart attacks or strokes would be to compare outcomes in people who have been screened to people who haven't. Life Line has never done this, but various medical organizations and the U.S. Preventive Services Task Force (USPSTF) have reviewed all the evidence about screening and have issued these recommendations for the general public (U.S. Preventive Services Task Force n.d.):

• **Carotid artery:** screening for people without symptoms is not recommended; the harms of screening outweigh the benefits.

• **Abdominal aortic aneurysm (AAA):** one-time screening is recommended for men aged sixty-five to seventy-five who have ever smoked. No recommendation for or against screening for AAA in men aged sixty-five to seventy-five who have never smoked. Routine screening for AAA in women is not recommended.

• **Osteoporosis:** screening recommended for women over sixty-five and women under sixty-five who are at increased risk, but the preferred test is dual-energy x-ray absorptiometry (DEXA) of the hip and lumbar spine. No recommendation for men.

• **Peripheral artery disease**: no recommendation; insufficient evidence.

• **Atrial fibrillation:** insufficient evidence to make a recommendation.

Do Life Line's customers know this? Is Life Line giving their customers the information they need to provide informed consent? I doubt it.

Then there is blind spot mapping, a test devised by Ted Carrick as a do-it-yourself measurement of blind spots that supposedly demonstrates that brain function is normalized by chiropractic manipulation of nonexistent subluxations. It demonstrated no such thing, and the research was seriously flawed (Hall 2011).

Conclusion

People are easily seduced by anything that promises to tell them more about themselves. They eagerly fill out magazine questionnaires to find out how happy their marriage is or which Harry Potter character they resemble, and they avidly consume horoscopes. They jump at the chance to self-diagnose with tests they can do at home. There are two reliable evidence-based sources they should look to for guidance: the USPSTF guidelines and the Choosing Wisely Campaign. The old adage is true: the patient who treats himself has a fool for a doctor. Tests are best ordered for valid indications by the patient's own doctor, who understands the patient's history, can interpret the test results, can treat diseases that are detected, and can provide follow-up care. There's a reason doctors are required to go to medical school. ■

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The Mandela Effect: How False Memories Are Created

Have you ever heard the phrase, "Play it again, Sam"? Many remember it as Ingrid Bergman's most famous line in the movie *Casablanca*. Upon review, however, it turns out that Bergman actually said: "Play it, Sam. Play 'As Time Goes By.'" Yet many remember the phrase as "Play it again, Sam," which was never uttered. Why?

It is not the only case. For example, there are those who remember that in *Star Wars*, Darth Vader spoke the phrase: "Luke, I am your father." In reality, the phrase is slightly different: "No, I am your father." While others recall the Queen in *Snow White* saying: "Mirror, mirror on the wall," the correct phrase is "Magic mirror on the wall."

What, if anything, do these instances prove?

In 2010, a theory began circulating on the internet explaining faulty memories that seem to affect many people. That year, Fiona Broome, a self-proclaimed paranormal consultant, explained that she remembered perfectly how Nelson Mandela died in prison in the 1980s. She remembered the news clips of his funeral, the mourning in South Africa, the heartfelt speech by his widow, and some rioting in cities in South Africa that started the collapse of Apartheid. But then she discovered that Mandela was still alive. Most importantly, she said, she discovered that many other people shared that same memory (Ratner 2017).

Broome called this phenomenon of collective misremembering the "Mandela effect" and suggested that these erroneous memories are actually proof that parallel universes or realities exist. She posited things happen in a similar—but not perfectly the same—way in these other dimensions. These seemingly wrong memories, according to the Mandela effect, are in fact memories, acquired by mistake, of such parallel dimensions. Others believe the Mandela effect demonstrates that we live in a simulated reality created by a higher intelligence. These memory errors, they say, are the equivalent of software glitches—like in the movie *The Matrix*.

However, psychology has a different view of what is happening here. These memory errors are exactly what we think they are: errors. Many get the idea that our brains work like a computer or the equivalent of video recorders, storing data perfectly in our mind and then retrieving it exactly as we received it. But this is not the case. Memory is a continuous process of creation and reconstruction, and memories change over time—even though we can be absolutely convinced of their accuracy.

There is also the fact that very often we remember scenes or phrases from films in an approximate manner and then these enter common jargon, as was the case with "Play it again, Sam," which became the title of a Woody Allen movie. However, the way in which false memories are created is so immediate and widespread that it is even possible to test it. Like, right now. Get a piece of paper and a pen. Next, read the following words aloud once:

> bed / rest / awake / tired / dream / wake / snooze / blanket / doze / slumber / snore / nap / peace / yawn / drowsy

Now close the magazine and write down all the words you remember.

According to the Deese–Roediger–McDermott paradigm (Pardilla-Delgado and Payne 2017), people tend to recall a word that is actually related to all the other words but is absent from the list. In this case, the word is *sleep*. Did you write it down? About half of those who participate in this type of experiment state afterward that they are sure they remember seeing the absent word (*sleep*), but this is the memory of something that never occurred, a false memory.

Memory is a very delicate mechanism and susceptible to many involuntary distortions, including false memories, suggestion, performance anxiety, social pressure, and confabulation. This is the fusion between different memories or the union of true memories and fantasies. That's why the next time you hear people saying, "Why, yes! I remember it very well!," you can be pretty sure that they are overestimating the capabilities of their brains.

And what about the idea of a multiverse or simulated reality? These could very well be, for quantum physicists, not only sci-fi lovers, actually spend time speculating about it (see, e.g., Stein and Dobrijevic 2021). However, until evidence of such alternative realities is found, we can rely on the reasonable explanations offered by modern psychology on how false memories are created (Bornstein 2017; Laney and Loftus 2013) and try to make things work better than they are at the present in the only world and universe that we know there is: our own. ■

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[BEHAVIOR & BELIEF STUART VYSE

Stuart Vyse is a psychologist and author of *Believing in Magic: The Psychology of Superstition*, which won the William James Book Award of the American Psychological Association. He is a fellow of the Committee for Skeptical Inquiry.

Yes, The Dunning-Kruger Effect Really Is Real

Ignorant of your own ignorance. Frequently applied in a political context, the Dunning-Kruger (DK) effect has rapidly become a famous psychological concept. It describes a kind of double-whammy. If you suffer from the DK effect, you know very little about a subject—which is bad enough—but you also have the false impression that you know considerably more than you do. In a world where the views of experts are regularly dismissed (Nichols 2017) and many internet users think they know more about medicine and foreign policy than people who actually studied those subjects in school, the DK effect seems to explain a lot. People who are unskilled or unschooled in a subject also suffer from a "metacognitive deficit." Metacognition is thinking about your own thought processes, and it is separate from the basic thinking you do while solving a problem or taking a test. According to Dunning and Kruger, people who are ill informed often don't know it.

But not long after the DK effect was identified, it was challenged. This is only proper and part of the usual scientific enterprise, but in this case, some authors came to the conclusion that what Dunning and Kruger had seen was just a statistical artifact of the process of measuring people's performance and expectations. The objections to the DK effect can get quite technical, but I will do my best to keep it simple.

The Basic Effect

In Study 2 of Kruger and Dunning's original article (Kruger and Dunning 1999), the authors gave college students a twenty-item test of logical reasoning with questions drawn from the Law School Admissions Test. After completing the test, each student was asked to rate their performance relative to others on a percentile scale and also to predict the number of items they got correct. In presenting the results, Kruger and Dunning grouped the participants into quartiles (e.g., lowest 25 percent of scorers, next 25 percent of scorers, etc.). The classic finding is shown in Figure 1 below, a hypothetical graph that I created on my computer. People who scored low relative to other people greatly overestimated how well they did. Conversely, the people who scored in the top quartile slightly underestimated their performance. This kind of finding has been replicated many times by researchers in different laboratories with tests on a variety of subjects.

Maybe It's Just Noise

One of the first challenges to the DK effect was that it was just noise, random errors of measurement. This was a quite reasonable hypothesis because random error added to the blue actual

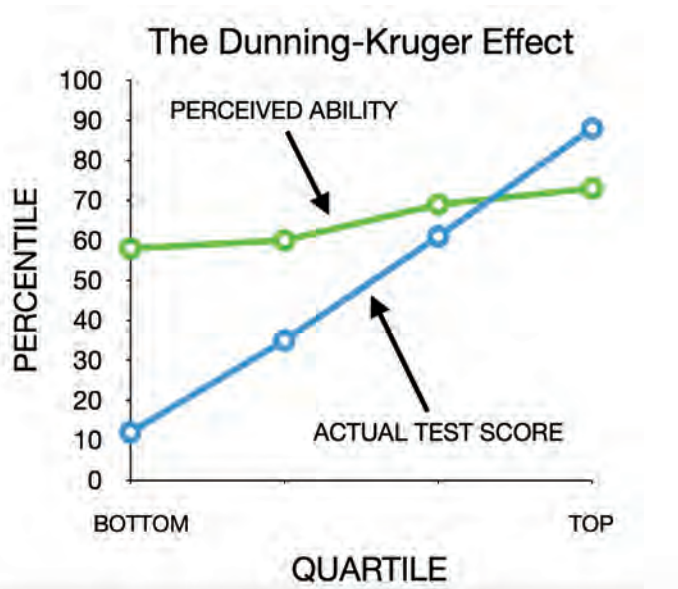

Figure 1. A graph drawn by the author showing a classic Dunning-Kruger effect outcome.

score diagonal of Figure 1 would tend to flatten the line. At the extremes, random error will bump up against the 0 and 100 endpoints of the scale, causing the quartile averages to move toward the center (see the left panel of Figure 2). Meanwhile, scores in the center two quartiles are farther from the endpoints and, assuming random errors both above and below the accurate score, we would expect those means to move less. The result is a kind of regression to the mean: the tendency of extreme scores to be followed by scores that are closer to average. Several researchers have run simulations that produced this effect by introducing random error to the participants' estimates of their performance (Burson et al. 2006; Jarry 2020; Vincent 2020).

But adding noise only gets you part of the way to the classic DK effect. As you can see, in the classic graph (Figure 1), the separation is greatest for the low scorers, and the crossover to underestimating performance happens between the two highest quartiles. The second step that gets you the rest of the way to the DK effect is to add in some overconfidence. It goes by several names, including the "better than average effect" or the "Lake Wobegon effect," but it describes a widespread tendency to overestimate one's ability. In a classic study, 60 percent of a sample of U.S. drivers said they were in the top 20 percentile of drivers on the dimension of safety—a mathematical impossibility (Svenson 1981). Similarly, another study found that 42 percent of respondents said they had more friends than their friends had, and only 16 percent said they had fewer friends than their friends had. In fact, due to a mathematical oddity called the "friendship paradox," most of us have fewer friends than the average number of friends our friends have (Zuckerman and Jost 2001).

Adding an optimistic bias to the participants in a DK simulation has the effect of lifting the perceived performance line up for everyone, and "voila!" you get the picture in the right-hand panel of Figure 2. This looks very much like the classic DK effect as seen in Figure 1, and these combined factors have been simulated by several researchers to produce the classic DK pattern (e.g., Vincent 2020).

The psychological implications of this explanation are quite different from what Dunning and Kruger have suggested. It would still be true that the low scorers are substantially off in their assessment of their own abilities, but if the observed separation at the bottom of the scale is produced by noise plus overconfidence, then there is nothing special happening for low scorers—other than, of course, they don't know much about the subject being tested. Dunning and Kruger have described low scorers as having a metacognitive deficit—or "meta-ignorance" as Dunning (2011) has referred to it—that is not shared by the people who score better. The noise plus overconfidence combination suggests that people differ in just one way: their knowledge of the subject area.

Sorting It Out

Last year as I was finishing up my latest book (Vyse 2022), a reader pointed out that I had mentioned the DK effect and that it was the reader's impression that the effect had been revealed as a statistical artifact, that it wasn't real. I'd read some of the criticisms and had formed my own opinion. Admittedly, I loved the notion behind the DK effect—being ignorant of your own ignorance. I was particularly fond of a 2018 (pre-pandemic) study that showed that over a third of participants thought they knew more about the causes of autism than doctors and scientists (Motta et al. 2018). The authors found participants who showed this

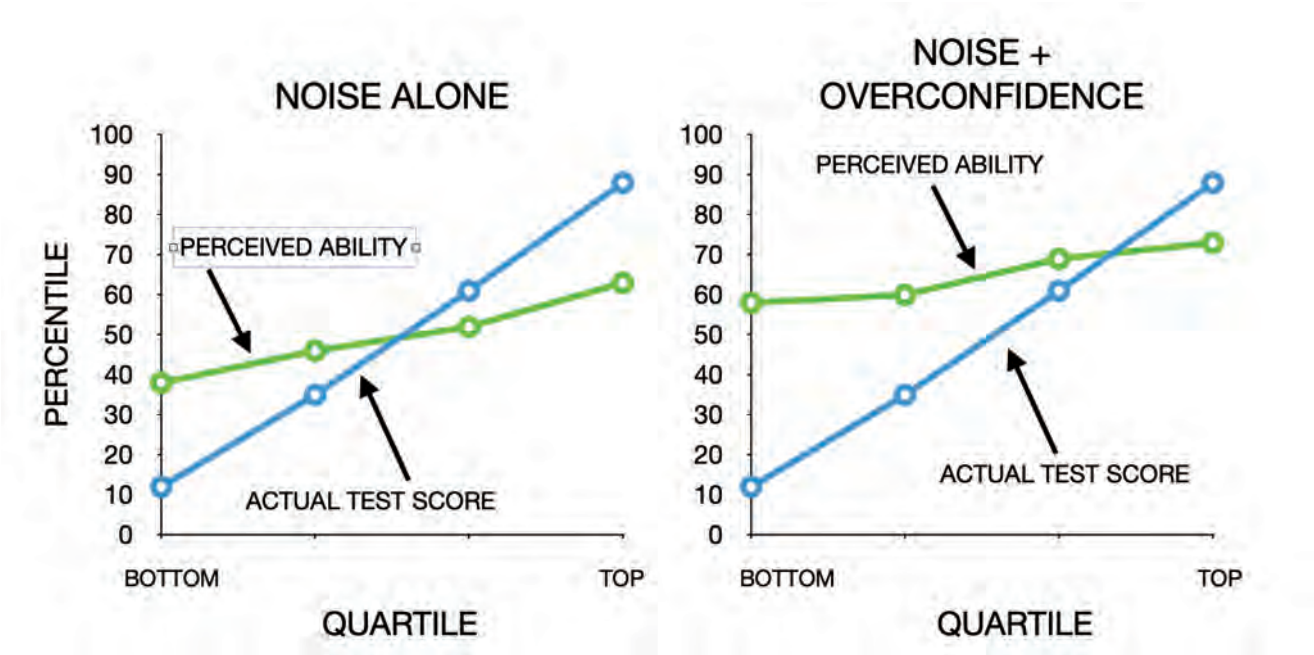

Figure 2. Adding an optimistic bias to the participants in a DK simulation has the effect of lifting the perceived performance line up for everyone.

overconfidence about their medical knowledge were more likely to support the role of nonexperts (e.g., celebrities) in setting mandatory vaccine policies.

Knowing I had a preference for one view, I began to worry I was making a mistake and that the mistake would be memorialized in my book for all time. So, I read as much as I could from the critics, and I contacted David Dunning directly to ask him if he still believed the DK effect is real. He was quite firm in his belief that the effect is real and not merely a statistical fluke. He supported his view by pointing to the many contexts in which it had been replicated—which, while impressive, I did not accept as proof—and to some studies testing alternative explanations for the DK effect. The most convincing of these was a recent large-scale study published in *Nature Human Behaviour* (Jansen et al. 2021) that included many improvements over previous studies. For example, Jansen and colleagues conducted two studies, one on logical reasoning and one on grammar, each with over 3,000 online participants. This large sample guaranteed that there would be sufficient people at the extremes of high and low performance to accurately trace the relationship between actual and expected test scores.

The results showed an astonishing level of inaccuracy in expected scores. For example, on the grammar test, the lowest performers who got either zero or one question correct (out of twenty questions) expected on average to have scores of approximately twelve correct(!). By comparison, high performers who got all twenty questions correct underestimated their performance by a much more modest amount, expecting on average to get approximately sixteen correct.

The authors created a Bayesian mathematical model that, in simple terms, suggests that people make a rational effort to adjust their estimates of their performance based on experience. For our grammar and logical reasoning test takers, no feedback was given during the test; so, if people adjusted their expectations of their total score, it would have been on the basis of rather murky intuitions about how well they had done. Under these circumstances, a person who comes in expecting to get approximately sixteen out of twenty correct but—unbeknownst to them—gets only four correct will often not have enough information to adequately adjust their estimate downward. They may be acting rationally but with insufficient information. Assuming most people come in with rosy expectations, this rational Bayesian model might explain why low scorers overestimate their performance. Jansen and colleagues (2021) tested this model but found that it did not fit the data as well as a model that took into account the participant's actual score. This is because low scorers were even farther off in their estimates of their scores than the rational Bayesian model could account for. A news item accompanying the article in *Nature Human Behaviour* summed up the results up this way:

> In other words, not only is the Dunning–Kruger effect not merely a statistical artefact at the group level, it also cannot be explained solely by Bayesian shrinkage in the rational estimations of individual participants. … Jansen and colleagues' model fits make clear that the data are best captured by a performance-dependent change in estimation noise. (Mazor and Fleming 2021, 677)

In other words, the observed DK effect was not created just by overconfidence plus random noise or by some rational but flawed process employed equally by all participants. Poor performers were different. They were farther off in their predicted scores than middle and higher performers, and when the model took into account their actual performance on the test, it fit the data better.

Of course, models are only as good as their starting assumptions, and the debate will continue. But for now, in my opinion, the balance of evidence seems to be in favor of the reality of the DK effect. Many people who lack knowledge in a subject area suffer doubly: they are both ignorant and ignorant of their ignorance. This is a troubling idea. But perhaps the hardest lesson to learn about the DK effect—often stressed by David Dunning himself—is that this problem is not limited to some other group of people safely off in the distance. Depending on the area of expertise, the Dunning-Kruger effect applies to us all. If ignorant enough, under many circumstances, we will fail to recognize how ignorant we are. Ideally, the message of the DK effect is both troubling and humbling. ■

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[THE PRACTICAL SKEPTIC MICK WEST

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An Inconvenient Counterexample

On March 21, 2022, China Eastern Airlines Flight 5735, a 737, experienced a sudden and catastrophic event. Cruising normally at 29,000 feet, something happened to cause it to go into a steep dive. After hurtling downward for a minute, records show it briefly leveled off at 8,000 feet, then plunged again, even faster, before crashing at high speed into the ground.

It hit farmland at a near-vertical angle. Local rescuers, unaware of the speed and severity of the crash, rushed to the site in the hope of finding survivors. When they arrived, the scene was bleak. A few small pieces of the plane lay scattered around and some trees above the site were on fire, but the site was dominated by a lack of anything recognizable as a crashed plane.

There was a crater at the center of the site. Scattered around were some belongings of passengers but no bodies. The pieces of the plane that were strewn about were parts of the tail or the tips of the wings. A flight data recorder, also located in the tail, was recovered two days after the crash, the same day that "some human tissue" was first recovered (Jia 2022).

The grim reality of the crash scene, combined with flight-tracking data and a security camera showing the plane descending vertically, painted a bleak picture. The crash was unsurvivable. Hitting the ground at several hundred miles per hour killed everyone aboard instantly. The plane's fuselage punched deep into the soil, simultaneously compressing, disintegrating, and getting buried. Some loose items and parts of the exterior and tail of the plane were projected away from the impact, but the bulk of flight 5735 ended up underground.

Flight 93 crash site in Pennsylvania (Government Exhibit P200057)

The Flight 93 Crash

This will instantly remind readers of conspiracy theory of the tragedy of Flight 93. The fourth plane hijacked on 9/11, Flight 93 was heading toward Washington, D.C., where the hijackers intended to crash it into the U.S. Capitol building. The passengers had been making phone calls with the seat-back phones and learned of the attacks on the World Trade Center and the Pentagon. A group of passengers stormed the cockpit, and in the ensuing struggle the plane became inverted and flew at high speed, near-vertically, into the ground.

The result was very much like Flight 5735. There was a crater with most of the plane underground. Small bits of the plane were scattered around. A fire burned nearby trees. When rescuers arrived, there were no signs of human remains.

The similarities between the two crashes, both in the initial crash scene and in subsequent investigations, recovery, and cleanup, are significant. Footage from both events shows blue canopies set up in staging areas and numerous investigators in protective gear. Excavators were brought in to dig ever deeper. There was the gradual recovery of one

flight recorder and then the other. Eventually, jet engines were recovered from deep underground.

Loose Change

Back in the early 2000s, the Flight 93 site was stunning in its uniqueness. Overshadowed for a while by the larger events at the World Trade Center, Flight 93 gradually gained the attention of an increasing number of conspiracy theorists. This reached a tipping point in 2005 with the release of the documentary film *Loose Change*.

Loose Change was one of the first and most significant conspiracy-promoting films to leverage the internet for free distribution and a subsequent huge audience. A significant portion of all 9/11 conspiracy theorists trace the origin of their belief to watching a version of *Loose Change*. The film covered the usual theories about the building collapses looking odd and the lack of a visible plane at the Pentagon, but it also devoted a significant portion to Flight 93, stating, "Perhaps the most shocking evidence of all is that at the crash site itself there is absolutely no trace of Flight 93. Nothing but a large crater." The film also quotes several eyewitnesses giving their first impression of the site, which they (obviously and understandably) described as just a hole in the ground.

Leveraged Uniqueness

Those who create conspiracy theories exploit the tendency people have to seek simple explanations for novel situations. The collapse of the Twin Towers was both horrifying and perplexing in its violence, so it was not difficult to explain it as being the result of explosions to the conspiracy-minded.

The Flight 93 crash site also seemed inexplicable. When people picture a plane crash, they imagine a plane lying on the ground—perhaps broken into pieces but still recognizably a plane. This is because most plane crashes are at relatively low speeds because they happen when the pilot is trying to land or during takeoff. If you do a Google image search for "plane crash," 98 percent of the first page of results shows a recognizable plane.

So the Flight 93 crash site was unexpected and unique in most people's experience, creating cognitive dissonance. "Where is the plane?" became the obvious question. *Loose Change* did not immediately provide an answer except to say "the government is lying to you." The creators later built upon this foundation to concoct some ludicrous theory about faked phone calls and the plane being spirited away to an army base. Small recognizable pieces of the plane were, as at the Pentagon, nonsensically explained away as having been quickly planted by the FBI. Once you accept the false premise that there's no plane at the crash site, then anything goes.

To see how relevant this still is more than twenty years after the event, I conducted a short poll on Twitter. Out of the 300 people who identified as 9/11 "Truthers" (conspiracy theorists), 100 (33 percent) said they found the crash site suspicious, specifically due to the lack of a visible plane. An additional 10 percent said they once thought it was suspicious but later changed their minds. A slim majority of 57 percent claimed to have never found it suspicious.

A significant portion of all 9/11 conspiracy theorists trace the origin of their belief to watching a version of *Loose Change*.

So, for a significant number of people—a third of all 9/11 Truthers—the "Where's the plane?" question remains a foundational piece of evidence that underlies their belief in the conspiracy. That might then become part of a foundation for other conspiratorial beliefs, such as QAnon or even anti-vaccine views or climate-change denialism. After all, if the government can lie to you about a plane in a field, they can lie to you about anything. So it's something well worth addressing.

Offering Counterexamples

One of the most effective ways of addressing this type of conspiracy theory evidence is to supply counterexamples. I've done this successfully in many cases, including when "chemtrail" theorists claimed that contrails in earlier eras always quickly dissipated. I showed them a video of seventy years' worth of books on clouds that explained that they often did not.

Supplying a counterexample works because it is often perceived as neutral. People will respond better to information if it's something they can reasonably check for themselves or it's in some inarguable form—such as a fifty-year-old book in a library. It also works best if there are multiple examples.

Flight 93 was initially a difficult case to find useful counterexamples for. It was not that they didn't exist; planes had been burying themselves in the ground since World War II. In 1944, a B-24 Liberator crashed vertically when returning to the United Kingdom (Wright 2021). Eyewitnesses described a familiar scene: a brief fire, then a crater with no visible plane and just some parts scattered around. The plane, deep underground in farmland, was not excavated until 1974.

In 2005, the internet was still finding its feet. Older descriptions of such crashes were largely text based, and the comparisons fell flat. But sadly, over the years planes have continued to crash on occasion. In March 2019, Ethiopian Airlines Flight 302 experienced technical issues (later found to be a design flaw), which resulted in the plane flying vertically into the ground at nearly 700 miles per hour.

A depressingly familiar scene resulted: a crater, most of the plane up to thirty feet underground, a brief fire, some scattered debris. Photos of the crash site look eerily similar to Flight 93. It was a good counterexample, and this is what I wrote about it at the time: "With the tragedy of Flight 302, with its similar crater and lack of visible debris, the truthers are again forced

Flight 5735 crash site (credit: By 中国新闻网 / 道通智能 - Wikipedia)

to decide if they are going to give up a precious piece of evidence, or if they are now going to become Ethiopian 302 Truthers" (West 2019).

That was the first nearly exact counterexample; now, with the Flight 5735 tragedy, we have two—along with numerous other examples that replicate one or more of the things that Truthers find suspicious about Flight 93. When you can get these examples across to people, it makes a difference.

The Plasco Backfire Effect

Unfortunately, it doesn't always work. When I made the comment about 9/11 Truthers "going to become Ethiopian 302 Truthers," I was referring to the curious case of the Plasco Building—the first good counterexample relating to the 9/11 building collapses. Plasco was a twenty-story building in Tehran. On January 17, 2017, it caught fire, burned for a few hours, and then suddenly collapsed. This collapse exhibited many of the characteristics that the 9/11 theorists find suspicious about the collapse of the Twin Towers, such as expulsions of material—which they attribute to explosives but were actually just collapsing floors compressing air.

So, I thought, here's a great counterexample. Now they will have to drop those claims. The evidence set for conspiracy would be reduced again, and people would start to question their assumptions. Some undoubtedly did, because it is a pretty clear-cut counterexample. It assuredly has helped some out of the rabbit hole. But some people simply rejected it and claim it looked nothing like the collapse on 9/11. And some doubled down. They admitted it looked like the events of 9/11, but they claimed it was another conspiracy and the building had been demolished with explosives.

Led by the biggest 9/11 conspiracy promoters, Architects and Engineers for 9/11 Truth (which has more than $500,000 in its yearly budget), they became Plasco Truthers and started to lobby (in Farsi) the Iranian Government to comb through the wreckage for traces of nano-thermite. Then they started accusing me of being irrational for not seeing their truth (Walter 2018).

You can't win them all, and there's no magic bullet. But I've found that having a set of good, independently verifiable counterexamples is a valuable tool when trying to help someone mired in conspiracy thinking. I encourage people to gather such counterexamples before setting out to engage with believers. I think many of that 10 percent of former "Where's the plane?" believers were swayed by counterexamples, and if one minuscule good thing might come from the tragedy of Flight 5735, it might be that a few more people will be helped, a little bit, out of the rabbit hole. ■

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Replication in Skeptical Investigation

Q: **It seems that skeptics just debunk and naysay, but if they're so confident in their explanations, why don't they recreate the mystery and prove it?**

—A. J. Kitt

A: This question was directed at me in the context of Florida's famous Coral Castle (see this column, May/June 2006) but has appeared many other times when skeptics have offered plausible explanations for famous mysteries. In last issue's column, I addressed the (faulty) premise underlying the common assumption that because the famous 1967 Patterson and Gimlin Bigfoot film hasn't been replicated, it is not the hoax skeptics claim it is.

The question has broader implications for investigative skepticism. In many cases, using the principle of Occam's razor, replication should be enough to demonstrate that an extraordinary claim is indeed unlikely to be true. For example, self-described psychic-turned-"entertainment artist" Uri Geller rose to international prominence in the 1970s and 1980s performing various acts that were replicated by professional magicians, most notably the late James "The Amazing" Randi. Of course, this does not provide conclusive proof that Geller was simply a skilled magician instead of a psychic. It does, however, give critical thinkers a logical, rational, science-based reason to doubt the claims.

The issue of replication in science is pretty straightforward: It is essential for establishing the validity of an experiment. Because well-controlled studies are difficult to design and carry out, there is always the chance that a given outcome will be the result of random chance, experimenter bias, or any number of other factors. If a result is true and valid, then other researchers following identical procedures should, in theory, get similar results. Replication is such an issue in science that the inability to replicate results has garnered significant attention. BBC News reported that "Concern over the reliability of the results published in scientific literature has been growing for some time. According to a survey published in the journal *Nature* last summer, more than 70% of researchers have tried and failed to reproduce another scientist's experiments" (Feilden 2017). Skeptical investigation sometimes involves designing experiments and scientific protocols when testing dowsers, psychics, and others (see, for example, "Testing Natasha" by Ray Hyman in the May/June 2005 Skeptical Inquirer and James Underdown's work with the Los Angeles–based Center for Inquiry Investigations Group).

Depending on what's being measured, replication can be difficult under the best of circumstances. If you're trying to replicate a population study, it's important to look at the statistical methodology to be sure a representative sample was used; slight variations in the underlying populations can introduce confounders and thus create spurious (Type I and Type II) errors, suggesting that an experiment has not been replicated when in fact it has, or vice versa.

Replicating Unique Events

The idea of replicating an event or project to test the validity of explanations for it sounds simple in theory. For example, some people claim that the Egyptian pyramids were made by ancient astronauts. The (ahistorical) assumption is that people at the time didn't have the intelligence or technology to move the stones and build a pyramid shape. Since the pyramids were built around 2560 BCE, there are no photographs or depictions of them being created, although in 2015 papyrus records were found of pyramid construction tools. Egyptologists have a pretty good idea of where the rocks were quarried and how they were cut and moved, but conspiracy promoters are fond of noting that scientists have never actually replicated the pyramids. They claim that skeptics should build an entire pyramid using only materials

and tools of that era to prove how it could have been done.

This might seem like a reasonable challenge until you realize that such an effort would never be done—not because it *can't* be done but because it would be impractical. Duplicating the great Giza pyramid would take many years and cost tens (or hundreds) of millions of dollars. Who's going to pay for it? It would also be pointless, because such a replication would not be valid unless you used tens of thousands of workers (estimates range from 15,000 to 40,000) and spent a decade or more building it (as the original builders did). If some eccentric billionaire wants to fund it, he or she is welcome to, but scientists recognize it as a fool's errand.

In May 2015, a man named Paul Salo launched a project he claimed would prove once and for all whether the conspiracy theories about the September 11, 2001, attacks are true or not by replicating the World Trade Center collapse: "We will recreate 9-11 to the best of our ability [with] a fully loaded 767 and a similar structure to the WTC. We will crash the fully loaded (with fuel) plane (complete with black box) into the building using autopilot at 500 MPH." Salo aimed to test the debunked claim that jet fuel can't burn hot enough to weaken a building's steel structure to the point of collapse. While Salo's scheme had populist appeal, actually pulling it off as a valid recreation would be incredibly difficult, if not impossible, and expensive. For a real science experiment, you need to control for variables that could affect the results. In this case, there are many variables, including the size and weight of the plane, the building type, and so on. It also matters where the building is, because building codes vary wildly by country and region. Buildings in earthquake-prone regions are built differently (and able to sustain greater structural damage without collapsing) than those built elsewhere. Variations in construction materials will also complicate comparisons. For the experiment to be valid, Salo would need to build an exact replica of the Twin Towers; just any tall building will not do, because the load-bearing structures vary. (For more details, see "9/11 Conspiracy Crowdfunding Project Rises—and Falls" in the September/October 2016 SI and "Skepticism and Pseudoexperiments" in the September/October 2020 SI.)

Salo planned to "recreate as best as we can" the circumstances of the World Trade Center attacks. The problem is that "as best as we can" leaves an enormous margin of error, one so big as to make any results invalid and pointless. His results, were he to pull it off, would be sensational but hold no evidentiary value at all. The replication would be pointless and inconclusive no matter its outcome: If the building collapsed exactly as happened on September 11, conspiracy theorists would argue (correctly) that the conditions weren't exactly the same as in the original building collapse. If the building collapsed differently, that wouldn't prove anything either for the same reason. No one either questioning or defending the "official story" would accept his conclusions.

Photographic Replication

A photographic attempt at replication is seemingly more straightforward. Replication can certainly play an important role in skeptical investigation, though recreating the circumstances surrounding an "unexplained" event is far more important than necessarily duplicating or replicating a given sighting, photograph, or video.

It's actually quite easy to capture a photographic image that cannot easily be duplicated. A photograph is a two-dimensional representation of a split-second moment in time (depending, of course, on how long the exposure is) in a constantly changing environment. Replicating some photos is easy; a close-up photograph of an egg taken in 1950 might look identical to one taken with the same camera and lighting as one taken a century later. But outdoor photographs, or those of urban settings, are a different matter. Clouds come and go by the hour (sometimes by the minute), leaves change their position relative to each other, cars and people constantly change position, and so on. In most cases, a simple landscape photo will be difficult or impossible to exactly replicate 100 years later.

In the case of Bigfoot, recreating the film, as a practical matter, is enormously difficult under the best of circumstances—regardless of whether it depicts a Bigfoot. We can begin with the terrain, which like all other natural habitats has changed significantly in the past fifty-five years. Consider all the environmental factors at play: Trees die and fall, rivers and streams move, and so on. If someone did spend considerable time and effort to create a convincing Bigfoot costume and setting, that would not serve to silence the critics but bolster them. The response would not be, "Yes, you're right; it can be credibly duplicated," but instead, "Yes, but see how much money you had to spend! Patterson and Gimlin didn't have these resources, so it couldn't have been faked!"

A full and true replication may require the original people or objects, under the exact same conditions, depending on what part of the image is under scrutiny (a dark manlike patch in a shady wooded area, a face seen in a ghost image, or an odd light in the sky). Sunlight reflecting off a gleaming polished fender of a 1958 Corvette, for example, might potentially help explain a mysterious light or image, or an unnoticed off-camera shadow might create an optical illusion of a face. Substituting a 1984 Honda or a 2012 Ford in a replication photograph may or may not get the same results.

I've done replication in several of my investigations, but I'm always careful to include qualifiers and not claim to have duplicated anything exactly. There are also natural occurrences that can serve as a kind of replication of unusual events (for more, see Mick West's column in this issue). In the end, the suggestion that skeptics must replicate historical events with enough accuracy for a valid comparison is both a bald attempt to shift the burden of proof and a waste of everyone's time. ■

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The Social Dynamics of Conspiracy Rumors: From Satanic Panic to QAnon

A sociological approach can help us understand how conspiracy rumors work. This approach focuses on the influences of history, culture, and political organization rather than on personality psychology.

JEFFREY S. VICTOR

Almost all past interpretations of conspiracy stories focus on the psychology of personality, emphasizing personal beliefs, motives, and preconceptions while ignoring their social constructions in groups. This article instead takes an alternative sociological approach, one that focuses on the influences of history, culture, and political organization. The difference between focusing on a conspiracy "theory" and a conspiracy "rumor" is not purely semantic. One person can have a theory, but a rumor requires the participation of many people; it is a social phenomenon. Social groups are driven by forces beyond that of the individual personalities within it. People in the mob that attacked the U.S. Capitol on January 6, 2021, acted in ways that individuals probably would not act alone.

This article offers an analysis of how conspiracy rumors work. What does it mean to ask how conspiracy rumors work? By way of a familiar metaphor, we can think of conspiracy rumors in societies like a virus in the body politic. They have distant, ancient origins; mutate into different forms over time; and are extremely difficult to eradicate completely. Some forms are more harmful than others, and some people are more susceptible to them.

Many Rumors Are Rooted in History and Culture

In the spring of 1988, in my small city of Jamestown, New York, there was a rumor in our town about Satanic cults, which caused a panic. I was anxious to learn what was happening. I realized, as a sociologist, that I was investigating a fascinating social phenomenon.

Conspiracy rumors and panics are in my area of professional training. I began an investigation that eventually led to my book *Satanic Panic*, which tried to explain how these social phenomena work (Victor 1993).

The central theme in the rumors was the kidnapping

and murder of blond, blue-eyed virgins by Satanic cults. I knew what that meant right away, as would anyone familiar with the blood libel conspiracy story (Dundas 1991). A common theme in Satanic crime rumors since ancient times has been the kidnapping and ritual murder of children by the followers of Satan. Satan is a powerful cultural symbol for whatever, or whoever, causes the ultimate evil: the most harmful, most powerful evil. It is usually seen to be embodied in some widely disliked out-group, believed to be followers of Satan. These people become scapegoats for the underlying anxieties and fear in a society.

Folklore scholars regard Satanic crime rumors as a contemporary legend because the story themes and symbolism originated in ancient times but have constantly evolved and mutated until today. Satanic crime stories can be traced back to at least the Romans, who accused the Christians of being in a conspiracy to undermine the Roman Empire. One accusation against the Christians was that they kidnapped blond, blue-eyed virgins to sacrifice them and drink their blood during secret communion rituals. (Blond, blue-eyed Romans were a rarity and a symbol of high value.) Later, after the Christians took over the Roman Empire, the same accusations were leveled at Jews, who supposedly used the blood of virgins in their Passover rituals. The Blood Libel Myth against the Jews continued through the centuries in Europe and resulted in the murder of hundreds of thousands of Jews.

The most familiar example of harmful Satanic crime rumors is that of the witchcraft panics of the seventeenth century in the Massachusetts colony and in Europe. Many elderly widows were targets of scapegoating by the believers in Satan's evildoing and killed by being burned at the stake or hanged. Conspiracy stories employing the symbol of Satan will continue to be with us. As long as there are many people who believe in Satan, they will return again and again, albeit in mutated forms.

The Social Context of Belief: Birds of a Feather Flock Together

We can understand a rumor as a collaborative storytelling process. This insight came from my PhD advisor, sociologist Tomatsu Shibutani, in his study of rumors titled *Improvised News* (Shubutani 1966). What Shibutani meant was that a rumor is a collective group creation. It is a constantly evolving story that many people contribute to during a time of ambiguity and uncertainty about a matter of concern. Rumors are communicated by people who think that they have juicy bits of news to share. They share these "secrets" as a way of bonding with friends, just like children share secrets as a bond. Rumors are usually spread by people who believe the stories but may also be spread by people who are simply curious or by pranksters.

How can so many people believe in a bizarre conspiracy rumor? The usual answer is that belief is due to people's poor education or their ignorance. However, the fact is that most of the people who believe bizarre rumor stories hold culturally based preconceptions that match the basic assumptions of a particular conspiracy story. We can all be seduced into believing a specific rumor if the stories fit our preconceptions. My research found, for example, people who held a belief in Satan as the embodiment of evil were most likely to give credibility to Satanic cult crime rumors. They were likely to believe that followers of Satan commit horrendous crimes, such as murdering virgins in ritual sacrifices. In comparison, people from different cultures and religions who did not believe in the existence of Satan did not give the rumor stories any credibility.

Concretely, I was able to trace rumor communication networks by recognizing people's cultural preconceptions. I became aware of different communication networks only when I asked the custodians at my college about the rumors. By way of a principle: different rumors travel in different communication networks. People in different communication networks live in different social worlds, isolated from each other. Today, that isolation has increased, because of the internet. My research found that the communication networks of fundamentalist Protestants were particularly (although not exclusively) likely to spread Satanic cult crime rumors: in churches that I visited, in religious publications that I read, and at conferences about Satanic cult crimes that I attended (Victor 1994).

Another key to understanding why so many people believe bizarre rumors is the social phenomenon called the "consensual validation of reality." When people in a particular communication network hear the same stories over and over again, or read about them on their computers or smart phones, it becomes their reality. The consensual validation of reality occurs in online networks when people are enveloped in a homogeneous communication environment of family, friends, neighbors, fellow churchgoers, and Facebook "friends."

Trying to change the thinking of individuals who believe conspiracy stories is like trying to change the personality of drug addicts, then sending them back to the streets to their drug-addicted friends and drug dealers. Networks of believers socially reinforce an individual's belief in particular rumors.

QAnon conspiracy stories emerged in 2017 out of an obscure internet message board, which originally imitated the Pizzagate conspiracy stories about children being kidnapped in pizza shops (Network Contagion Research Institute 2020). However, the current QAnon conspiracy stories can be traced back further to the Satanic cult rumors of the 1980s and even to ancient times. QAnon followers claim that there exists a cabal of Satanic, cannibalistic pedophiles who operate an international sex trafficking ring and who control the United States government. Many followers believe that Donald Trump will save America from this evil.

QAnon conspiracy believers are an internet community in which people collaborate in creating and passing on constantly evolving rumors. On many different platforms, believers present commentary, analysis, guest interviews, and even streaming videos. Different conspiracy theories are thrown

into the QAnon community like a lumpy stew. The stew includes: Trump's "Stolen Election" lie, lies about COVID-19 vaccinations, and even the usual anti-Semitic paranoia. Much of it appeals to extreme right-wing preconceptions. Some participants are anonymous; others are not. The effect is similar to a community spreading rumors by word-of-mouth.

So, who believes QAnon Satanic crime conspiracy stories? A public opinion poll done by the Public Religion Research Institute and published in May 2021 provides some answers (PRRI Staff 2021). The survey found that while only 15 percent of Americans believe the QAnon stories, in certain religious subcultures a far larger percentage believes them. About 25 percent of white evangelical Protestants and 26 percent of Hispanic Protestants believe that Satan-worshipping pedophiles control the U.S. government, the media, and financial institutions. In contrast, the stories were believed by only 10 percent of white mainline Protestants, 11 percent of white Catholics, and 8 percent of Jews. Several other social groups also have a high percentage of people who believe the stories, such as Republicans and people who are socially conservative. In other words, QAnon rumors are spread mainly through the communication networks of fundamentalist Protestants and other very conservative people.

The attraction of money and power is another social mechanism that spreads conspiracy rumors. Many people's perceptions can be distorted by skilled conspiracy entrepreneurs who sell lies and provoke fear to gain money and power. During the 1930s, Father Coughlin spread lies on the radio about a Jewish world conspiracy. During the 1950s, Joe McCarthy spread fear about a Communist conspiracy to take over our country. Today, conspiracy fears are being spread by influential people, such as Donald Trump and radio host Alex Jones, to gain money and power. Millions of people saw on television, in real time, a violent mob invade the United States Capitol building. Yet many thousands believe propaganda, promoted by some right-wing politicians, that they *actually* saw anti-Trump, antifa demonstrators.

Words Have Social Consequences

Another useful key to understanding bizarre rumor stories is the social psychological principle (called I.W. Thomas's theorem): if people believe that something is real, it is real in its consequences. And the consequences can be very harmful. There is no way to determine the exact numbers of innocent people who were harmed by false accusations resulting from Satanic cult rumors. However, various research efforts suggest that the number is in the many thousands, harmed by included threats of violence, false accusations of crime, imprisonment of innocent people, and destruction of families.

As I continued gathering information about the consequences of Satanic cult crime conspiracy rumors, I found that more and more people were being hurt—sometimes severely—by the rumors. I became increasingly aware of false accusations of crime against innocent people caused by these rumors. For example, some scapegoated countercultural teenagers were accused of serious crimes by prejudiced police and

ambitious prosecutors in conservative small towns. The most famous case took place in West Memphis, Arkansas, with the 1994 trial that became known as the case of the "West Memphis Three." In that case, three unfortunate teenagers were falsely accused of brutally murdering three eight-year-old boys during Satanic rituals. The accusations aroused local anger and desire to quickly find someone to punish. The three accused teenagers were convicted and sentenced to life imprisonment. Their case received national attention in the mass media and in documentaries (such as the *Paradise Lost* series), which questioned the competence of the prosecution. Eventually, in 2010, they were released after spending eighteen years in prison.

There were also cases of children's daycare workers falsely accused and arrested for so-called ritual sexual child abuse. According to newspaper reports, there may have been over 100 cases. People falsely accused of sexual abuse of children by Satanic cults numbered in the many thousands. A study of 12,264 such accusations published in 1995 by the National Center on Child Abuse and Neglect didn't find a single verifiable case (Bottoms et al. 1996).

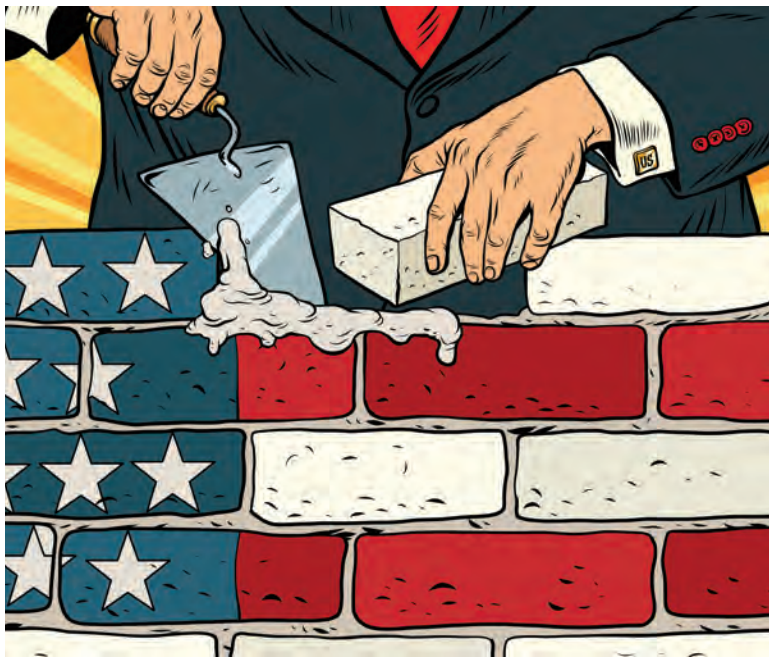
The QAnon conspiracy rumors are even more dangerous because they pose a threat of large-scale violence. One of the consequences of the QAnon conspiracy stories was the mob assault on the Capitol building, in an act of domestic terrorism. The presence of QAnon conspiracy believers was evident in the crowds of QAnon signs, amid Nazi swastika flags and Confederate flags, proudly carried by members of the mob. As a result of the attack, one attacker was shot to death, one policeman died from a stroke, four other policemen died from suicides shortly afterward, and over 100 were severely injured. Repairs to the Capitol building are estimated to cost at least $30 million.

A Pressure Cooker Needs a Release Valve

A well-founded sociological principle suggests that rapid social change causes widespread social stress as people try to adjust to the changes. The anxiety and stress, in turn, leads to the search for scapegoats to blame for people's daily problems. The conspiracy stories claim that "those people" are to blame for our problems.

The most familiar case is that of the German people after their defeat in World War I, when Germans experienced loss of jobs and evaporation of their income due to widespread unemployment and hyperinflation, leading to political conflict in the streets. The conspiracy stories blamed Jews, Communists, and immigrants for people's plight.

What social conditions and stress in people's lives can account for the return of Satanic crime rumors among QAnon believers? The underlying anxiety that can help us to better understand what is motivating the QAnon believers is fear of unfamiliar people caused by demographic changes in the American population. There is a widespread anxiety among



white people in some areas of our country where the ethnicity of the population is undergoing rapid change. Rumors spread the claim that "our country is being taken over by people who are not real Americans" (meaning dark-skinned people, immigrants who don't speak English, and people who are not Christians). This fear of replacement is an expression of white ethnocentrism, or what has been called white Christian nationalism. It is the fear expressed indirectly in concerns from some white parents about teaching about "diversity" and about systemic racism in public schools (falsely labeled "critical race theory"). It is the fear expressed in the claim, "They are taking over our country" and implied in Trump's slogan "Make America great again."

There is some strong evidence of fear of ethnic replacement among significant numbers of white people. Researchers at the University of Chicago's Project on Security and Threats studied the backgrounds of 193 people charged with crimes during the violent attack on the Capitol on January 6, 2021 (Pape 2021). Surprisingly, these people had only one thing in common. It was not their socio-economic or educational level or rural versus urban residence. They were disproportionately white people from counties where the white population was rapidly declining and being replaced by nonwhite people. Anyone who watched the January 6, 2021, insurrection on television could see clearly, amid the QAnon signs, that the mob comprised white people almost exclusively (95 percent according to some estimates).

To Inform or to Punish? That Is the Question

There is scarce research on the successful control of large-scale rumors, perhaps because there have been very few

successful efforts to control widespread conspiracy rumors. Most research on ways to control rumors involves marketing studies paid by large companies to deal with malicious rumors targeting their consumer products. For example, there have been rumors about hamburgers cooked with worms and urine in foreign beer. Most marketing studies recommend "informational" approaches that rely upon public relations techniques to cope with rumormongers. This means providing information to correct the false claims in harmful rumors and highlight the benefits of the company's products. Unfortunately, informational approaches are of little use in trying to deal with nationwide conspiracy rumors.

An alternative might be termed a *punitive approach*. Such an approach may employ derogatory labeling to shame rumormongers, civil lawsuits to target specific groups, or even criminal prosecutions. An example was a slogan used by the U.S. government to discourage rumormongering during World War II: "Loose lips sink ships." It was a brief, concise, and effective way of shaming people who might want to communicate a juicy piece of news that they heard from a friend-of-a-friend. It was successful in preventing misinformation that could cause local panics or damage national morale.

An example of a successful punitive approach was the case of Procter and Gamble Corporation, which was the target of malicious Satanic cult rumors. The rumors began circulating in the early 1980s, at the peak of Satanic cult rumors, claiming that Procter and Gamble's logo—a bearded man-in-the moon looking over a field of thirteen stars—was a symbol promoting Satanism. Rumors also circulated that the company contributed money to support the Church of Satan. In 2007, the company won a $19.25 million civil lawsuit against four former Amway distributors, competitors whom they accused of spreading rumors linking the company to Satanism. It took decades of persistence and a lot of money to put a scare into the rumormongers.

Another example of successful lawsuits used to stop harmful conspiracy rumors comes from the defamation lawsuit brought by eight parents of children murdered in the 2012 shooting at Sandy Hook Elementary School. Several right-wing conspiracy theorists, most prominent among them radio talk show host Alex Jones, claimed that the murders were faked by paid actors to promote gun control. The lies were circulated on social media. As a result of the lies, some of the parents were harassed by death threats and were forced to move. Parents sued Jones, and in November 2021 he was found liable for damages.

An example of shaming people who communicate dangerous conspiracy rumors comes from France. In 1969, a rumor circulated in the City of Orleans that teenage girls were being kidnapped in clothing stores, drugged, and sold into white slavery. The stores had been recently opened by Jewish immigrants from North Africa. (This was another remnant of the blood libel.) Local parents became worried because the stores sold "shocking" new fashions, such as the miniskirt. The rumors were widely communicated and resulted in store closings because of boycotts and demonstrations. The rumors were investigated by a team of sociologists from the French government's national research center, led by Edgar Morin. His book, *Rumor in Orleans*, quickly received national attention (Morin 1971). The rumors were contained after the news media and many antihate organizations publicized the fact that the rumors were anti-Semitic and passed around by anti-Semites and fascists. Labeling and shaming the rumormongers eventually ended the transmission of the lies.

Attempts to control dangerous conspiracy rumors must deal with them as a social phenomenon and not simply an expression of the personality quirks of individuals. This means that they are anchored in communication networks that often have an ideological or religious following. This in turn means that managing dangerous conspiracy rumors must combine ways of relieving underlying causes of social stress in people's lives and ways of punishing the most outrageous promoters of harmful lies. ■

Acknowledgment

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Jeffrey S. Victor's book *Satanic Panic: The Creation of a Contemporary Legend* received the H. L. Mencken Award from the Free Press Association for the best book of 1993. He is a retired professor of sociology from SUNY Jamestown Community College. He earned his PhD from SUNY University at Buffalo in 1974. He can be reached at JeffreyVictor41@gmail.com.

The Telepathic Piddingtons: How Post-War Britain Came to Believe in Telepathy

In 1949, a young Australian telepathy act, the Piddingtons, broadcast on BBC radio and took Britain by storm, leading to an upsurge of popular belief in the paranormal. The way they convinced the population that they were not using trickery was a forerunner of later techniques designed to fool the public into believing the impossible.

PAUL ZEDANE

If a Mr. J.H. Davidson, assistant head of variety (music) at the BBC, had had his way in 1948, the British public would never have experienced a two-year media frenzy—as it wasn't called in those days—over the mind-reading abilities of a personable young couple whose deeds baffled everyone who tried to explain them.

Davidson had been approached by an agent on behalf of a couple of performers from Australia, Sydney Piddington and Lesley Pope, who had had some success with their mind-reading act on Australian radio. Their agent "wondered if it would be possible to do anything with them" on the BBC. "I cannot sincerely endorse the Piddington show as a feature of long-term radio interest," Davidson replied. How wrong he was.

In fact, over the next few months, with persistence from Piddington and the help of one or two more adventurous executives, the BBC decided to put its toe in the water. In a BBC memo on April 3, 1949, titled "Thought Transference Proposal," John McMillan wrote, "I think it would be worth while making a sample, which should be most inexpensive."

That "sample"—or pilot program—led to a contract for the Piddingtons to do eight live shows before an audience in a prime-time radio slot on Thursday evenings. McMillan clearly hadn't caught on to the fact that this was just a mind-reading act, because he suggested in his memo that the listening audience could participate in the "actual thought transference."

For the next two years, the entire nation was transfixed by the Piddingtons' exploits in weekly radio shows on the BBC's Light Programme, television specials, and a series of theatrical shows around the United Kingdom, culminating in a week at the London Palladium—Britain's biggest and most prestigious variety theater.

The radio shows attracted a regular audience of twenty million. That's 40 percent of the total population and probably more than half of those over sixteen, a similar proportion of the population to the U.S. viewers of *I Love Lucy*.

The best way to understand the impact of their effect is to listen to extracts from some of the original radio programs (available online at https://www.thepiddingtons.com/broadcasts.html). Stripped of the show biz elements, each program had several different types of "answer," which Syd "received" from someone else in the studio or Syd "transmitted" to Lesley, either elsewhere in the studio or somewhere more exotic outside it.

Australian telepathy act The Piddingtons were a sensation on British radio beginning in 1949.

Much of the glamor, and indeed the validation, of the Piddingtons' act came from the appointment of celebrity judges—singers, actors, "personalities"—who were asked to fix Syd's blindfold, collect things from the audience, or write things on a blackboard. There were also BBC personnel stationed strategically near Syd or Lesley on the lookout for

cheating (or "conjuring," as it's sometimes called).

Lesley was an attractive young woman, and, understandably, there was a certain amount of jostling among BBC staff to be allowed to accompany her to remote locations. On one occasion, there was a need for someone to accompany Lesley while she tried to receive Syd's thought in a Stratocruiser aircraft over southern England. In this case, there was a BBC memo marked "Confidential," which hinted that one particular announcer was not a safe pair of hands: "I understand they [the producers] have already spoken to M----- B---- suggesting that he should accompany Lesley Pope on the latter occasion. For reasons which I shall discuss with you privately I would rather have another announcer."

In the Stratocruiser show, the climax of the program was when a BBC producer, Ian Messiter, went around the audience asking people to hand him small personal items that he put in a large envelope. When he had collected enough items, he took the envelope on stage and tipped the items on a table for Syd to pick up one by one and "transmit" to Lesley in the aircraft. Apart from saying "Stand by" to the celebrity judge who accompanied Lesley in the plane, there was no communication between Syd and Lesley. After ten seconds or so, Lesley started naming and describing the objects one by one, sometimes more accurately than others—a pencil was called a pen and a wedding ring a brooch. When Syd selected a pound note, Lesley named it and then asked Syd to think of the note's number, which she "received" and relayed to the live audience with amazing accuracy.

An even more dramatic feat consisted of Syd collecting a sequence of numbers from random members of the studio audience, with one of them adding them up to get a total that led to a line in a 1,600 page book. Lesley then recited the line—from inside a diving bell—when given the cue to do so.

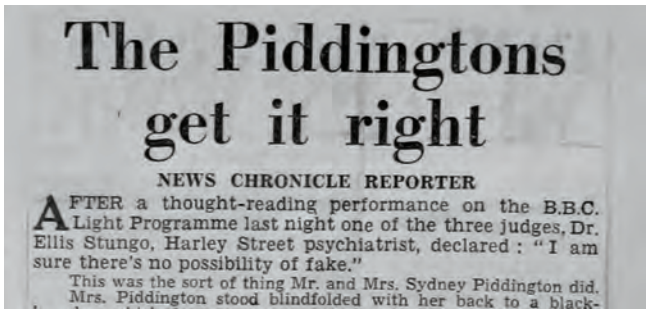
This was the true Piddington trademark repeated over and over again: some complicated piece or pieces of information gathered *in* public, *from* the public, and relayed and then recalled with uncanny accuracy—even though no visible or audible communication occurred between the two of them. This was often a point missed by the many people, including professional magicians, who complained that there was nothing different about the Piddingtons' act from other mentalism. However, these critics' attempts to explain the "trick" always involved some kind of visual or audible signaling between the two, which clearly didn't take place.

From the very first program, transmitted live on Thursday, July 7, 1949, the Piddingtons were a sensation. This was mainly due to their performances, of course, but it was helped by the youth and glamor of Lesley and by an exotic and moving backstory of how the mind-reading performance came to be developed. This was only four years after the end of World War II, during which Syd spent several years in the Japanese prisoner of war camp at Changi. It was there, according to Syd, that he and a couple of other prisoners developed a mind-reading routine to relieve the boredom of the harsh camp life. When Piddington returned to Australia after the war, he trained his girlfriend and later wife, actress Lesley Pope, to "read his mind" using skills developed in Changi.

While life in Britain was returning to normal after the war, there were housing shortages, fuel shortages, and food rationing, and radio was one of the cheapest forms of escapism for a public having to deal with the slowness of post-war recovery. There was television, for the wealthy few, but the real mass medium was radio, and the Piddingtons were offering something the average listener had never come across.

A selection of press comments that followed the first few programs show the impact they had. From the *Daily Mail*:

> Last night Syd Piddington, the tall slim 31-year-old man who first learned of telepathy when he was in a Japanese prison camp, and his beautiful 26-year-old actress wife, Lesley, convinced a panel of judges in a BBC studio that their "act" is genuine. During last night's half-hour broadcast there appeared to be no possibility whatsoever of collusion between the pair. Any "cheating" during the broadcast would have entailed the cooperation of the panel of judges.

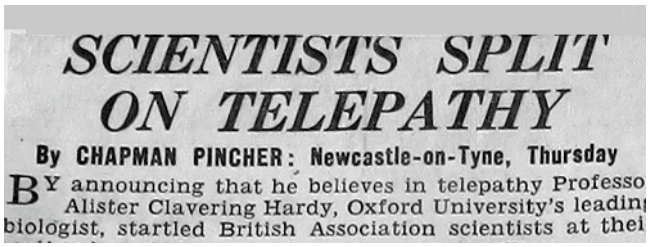


The Piddingtons get it right

NEWS CHRONICLE REPORTER

AFTER a thought-reading performance on the B.B.C. Light Programme last night one of the three judges, Dr. Ellis Stungo, Harley Street psychiatrist, declared: "I am sure there's no possibility of fake."

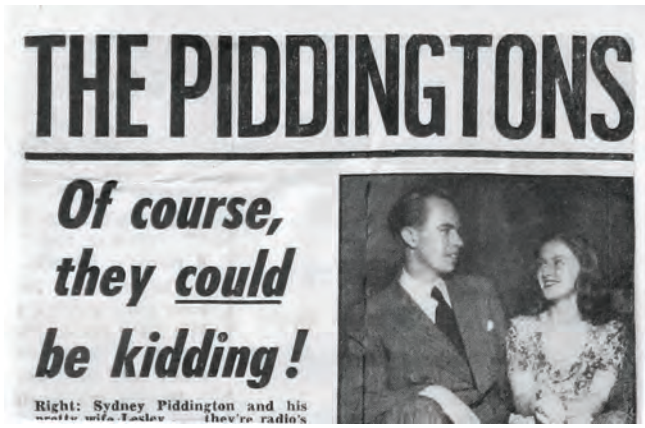
This was the sort of thing Mr. and Mrs. Sydney Piddington did. Mrs. Piddington stood blindfolded with her back to a black-



SCIENTISTS SPLIT ON TELEPATHY

By CHAPMAN PINCHER: Newcastle-on-Tyne, Thursday

BY announcing that he believes in telepathy Professo Alister Clavering Hardy, Oxford University's leadin biologist, startled British Association scientists at thei



THE PIDDINGTONS

Of course, they could be kidding!

Right: Sydney Piddington and his pretty wife Lesley — they're radio's

In his column in the *Daily Express*, Roy Rich wrote: "There is no doubt in Rich's mind that the Piddingtons are entirely genuine. Mr Piddington had to protest his authenticity far too often." Again, from the *Daily Mail*: "An astounding broadcast in which Sydney Piddington from a BBC studio, 'transmitted' by telepathy a chosen line from a pile of books to his wife, Lesley, who was locked in the Tower of London. BBC officials commented 'It's beyond us. There is no swindle.'" In an item from the *News Chronicle*: "After a thought-reading performance on the BBC Light Programme last night one of the three judges, Dr. Ellis Stungo, Harley Street psychiatrist, declared 'I am sure there's no possibility of fake.'"

One sign of the total preoccupation of the radio audience with the Piddingtons was the uproar when one of the shows overran and was faded out to make way for a prerecorded program of songs. According to an article in the *Daily Mail*:

> It was 9.30; their telepathy act was running late; the next program was due but so many listeners rang the BBC to ask how it ended that a special announcement was made before the 10 o'clock news. At once the bell started ringing at Broadcasting House as listener after listener telephoned. The BBC switchboard was completely blocked by the incoming calls. Said a BBC switchboard girl "We've never had anything like it."

All this might seem like merely an interesting piece of British broadcast history, but drilling down into the BBC archives and newspaper cuttings of the time reveals issues that have been central to every successive media storm over claims of the paranormal, from the psychic photography of Ted Serios, the psychic surgeons of the Philippines, the antics of Uri Geller, and even the storm over the Bible Code.

At the heart of all these stories, with the Piddingtons as a classic example, is the simple issue of "claims of the paranormal." If you say you are doing something paranormal—or even, as in this case, if you refuse to deny it—people would rather believe you, however extraordinary the claim, than accuse you of lying.

The success of the Piddingtons was because they never denied that they were "transferring thoughts." They even occasionally maintained that they were. How else to explain the following remark by Syd in a newspaper interview? "Lesley's reception is not word-perfect," the journalist writes, "but the meaning is invariably there. 'That's because I have to translate the words into images,' explains Sydney apologetically." In fact, he had to do nothing of the sort, as later revelations showed.

"You be the judge" was the Piddingtons' catchphrase, so of course the nation became a panel of judges. So too did BBC staff. As the title on McMillan's memo shows, even he thought that what the Piddingtons did was some kind of genuine telepathy.

The height of this gullibility came when one of the BBC producers, Freddy Piffard, wrote in *Radio Times*:

> I won't attempt to prove the genuineness of the Piddingtons' telepathy; I will just say it is genuine. Having produced five programmes, knowing every detail and every precaution taken, I can say quite truthfully that there never had been a single instance of fake thought transference by Sydney Piddington and his wife.

Considering that everything the Piddingtons did was known at the time to other BBC staff as "fake thought transference," this was a huge error by Piffard, and he was criticized internally by the BBC for saying it. It certainly contributed to the continuing belief of many people, including some who had been researching the paranormal for years, that at last the phenomenon of telepathy could be said to exist.

During the entire period of their radio programs, TV specials, and stage shows, there was no real resolution of the "genuineness" of the Piddingtons' act. The BBC tried to undo the damage, as they saw it, of Piffard's statement, as some kind of *imprimatur* of telepathy, by pointing out that it was all good, light-hearted fun. However, with each new demonstration in ever more contrived location, more people, some of them invited judges, gave personal testimony to the miraculousness of the events.

Before a second Piddington series in 1950, more memos flew trying to undo the damage done by Piffard the year before, including one that said: "I take it that every possible precaution has been taken to ensure that the commentators

in the forthcoming series will *not* claim that the Piddingtons have para-normal powers and will not suggest that the programmes are tests of telepathy."

But even after their last program in 1952, a journalist in *Two Worlds* headlined an article, "Amazing Success of BBC Thought Transference Test: Triumph for Psychical Research." The article continued: "A great step forward towards nation wide recognition of the powers of 'extra-sensory perception' was achieved by the most impressive and successful demonstration of 'Thought Transference' on the Light Programme last Thursday evening."

Looking back at the whole phenomenon, it seems to me that what the Piddingtons did was akin to taking candy from a baby. Because Lesley knew, even before a show began, what Syd would transmit—the sentence from the book or the list of objects from the audience—the run up to the climax of each show could be dramatized and milked for all it was worth.

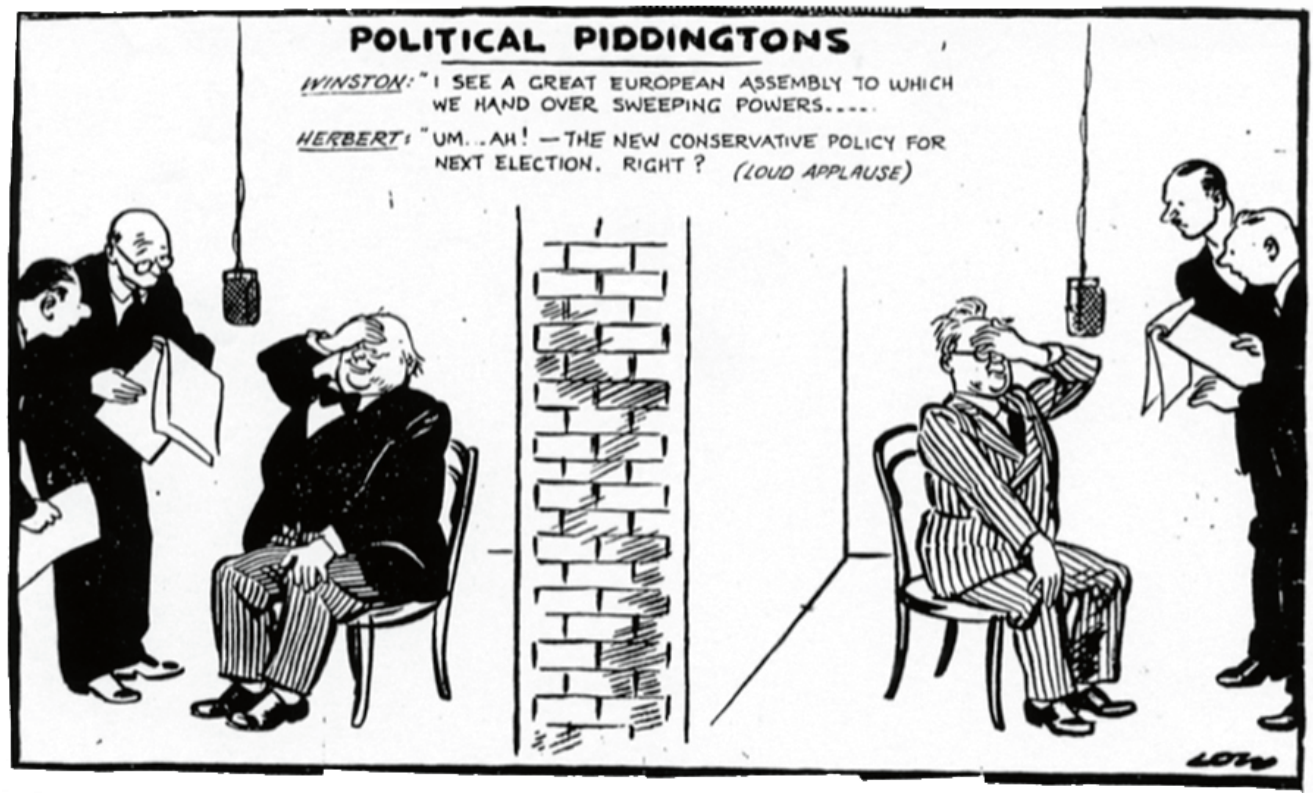
Syd appeared to rule out all possibilities of trickery. One of his boldest moves was to offer a £10,000 reward to anyone who could reveal that they used accomplices. In the light of the fact that they *did* use accomplices, this was a breathtaking offer to make, and a risky one, at a time when their fee from the BBC each week was just £30.

The appointment of "judges" was in the hands of the Piddingtons and one of the BBC producers, Ian Messiter. Many of them were well-known actors or celebrities, but, unnoticed, a couple had personal connections to the Piddingtons. One judge, "Dudley Perkins," was presented as a well-known lawyer with a special interest in fraud. In fact, he was not a lawyer at all but merely a student friend of the Piddingtons' manager. He was playing a part, so anything he did in the show was of very questionable objectivity.

There have been—and still are—two-person mind-reading acts that depend on verbal codes. But such a method was ruled out with the Piddingtons. There was *no* verbal or visual communication between the Piddingtons. As their act developed, they weren't even in the same studio, and their supposed thought transference took place despite greater and greater obstacles, culminating in Lesley receiving Syd's thoughts in a diving bell or an aircraft.

If the thousands of words written about the Piddingtons at the time are an indication, their act often provoked anger. But the anger was multifaceted. One outburst came from a leading journalist, Kingsley Martin, who had appeared as a judge and complained that the BBC was trivializing the topic:

> Telepathy is an extremely interesting and controversial subject in which serious enquiries under controlled conditions have been made and are being made. The BBC might have aided these experiments. In my opinion it will be difficult for the BBC again to persuade thoughtful people that it is really "investigating" telepathy or any other subject. Who is going to take its claim seriously? If the BBC is prepared to fool the public for the public's amusement, it puts itself in the same category as the music hall.


POLITICAL PIDDINGTONS
WINSTON: "I SEE A GREAT EUROPEAN ASSEMBLY TO WHICH WE HAND OVER SWEEPING POWERS.....
HERBERT: "UM...AH! — THE NEW CONSERVATIVE POLICY FOR NEXT ELECTION. RIGHT? (LOUD APPLAUSE)
LOW

Another group annoyed at the furor was professional magicians. One of them, N'Gai, was quoted in the *Daily Herald*: "Why the BBC should put the Piddingtons on, when many British conjurors can do better beats me. It's all based on codes and tricks."

I should here reveal a personal interest in the story. As a child, I was interested in conjuring, and I used to listen to the Piddingtons in a way I suspect many magicians did, convinced that if I listened carefully enough, I would understand how they did it. Because, like all skeptics, the one thing I knew—even at the age of ten or so and even before listening to the programs—was that no paranormal abilities were involved. Because, of course, such abilities do not exist.

But after reading the BBC files and the newspaper cuttings, it's clear to me that people who were not as curious as I am about how "paranormal" effects can be created, even those whose starting point was a kind of uninformed skepticism, were *driven* to believe in the Piddingtons' abilities as paranormal. Not only did they trust the claims made by these personable young people, but ESP was still part of the *zeitgeist* in a way it is no longer.

The results of J.B. Rhine's experiments, as well as the Soal-Goldney experiments, suggested that telepathy was real. It showed a modest increase in probability over randomness that gave hope to some that the power of telepathy could be harnessed. However, these results were later shot to pieces in investigations by Mark Hansel and others.

Holding the skeptic line is not easy when somebody tells you that black is white—"no accomplices,""randomly selected audience members," "neutral judges," and so on. While I can't say that I ever for a moment faltered in my skepticism, I got pretty near to it when thinking about the Piddingtons, because their effects seemed so inexplicable.

In the years after they disappeared from the British scene, long after their names were regularly in the headlines, I would occasionally try to find out if they, or someone else, had ever revealed the secret of how they did it.

I even visited Lesley Piddington in Australia in the 1980s and had a very pleasant but unrevealing conversation with her. By then, she had divorced Syd, and he had married another actress with whom he was still performing the telepathy act.

Then, in the 2000s, enter Martin Hart.

I have been careful not to give away the method, or methods, used by the Piddingtons, partly because they are irrelevant to the issue at the heart of this article—the human desire to believe the impossible and the way in which this is exploited by entertainers or less scrupulous people in other areas of public life.

But I cannot deny the deep sense of satisfaction I felt when I read a book written by conjuror Martin Hart (2015), who discovered in 1998 some notebooks kept by his grandfather that revealed the Piddingtons' secrets.

Unlike the feeling of disappointment that can come when you discover how an amazing conjuring trick is done, I felt no such let-down. Rather I merely had an admiration for the way the Piddingtons had pulled off the biggest feat of chutzpah in entertainment history. *They were just conjurors!*

And of course, they were among the first of a succession of conjurors whose acts filled audiences in the second half of the twentieth century with the hope that there was something science couldn't explain. These acts were fundamentally different from those of James Randi, David Blaine, Penn and Teller, and David Copperfield, who use(d) their consummate skills to achieve effects that are often impossible to explain but never assumed to be paranormal.

It is much more difficult to do real "magic" (i.e., conjuring) than fake magic (i.e., lying). What Syd Piddington exploited was the fact that if he said, "This sentence has been chosen randomly from a book, by a process involving random members of the audience and objective judges," people believed him. There was no explanation other than telepathy for Lesley's success. If Donald Trump says, "The election was rigged," and you believe him, there is no other explanation for his loss of the presidency, and you are understandably outraged.

Arthur Conan Doyle made Sherlock Holmes say, "When you have eliminated all which is impossible, then whatever remains, however improbable, must be the truth." The one truth no one ever considered at the time was that Piddington, BBC producers, a handful of judges, and even some members of the audience were lying.

The Piddingtons' last broadcast took place on Friday, June 13, 1952. BBC producer Ian Messiter—who, according to Martin Hart's book, knew the most about the inner workings of the act—wrote in *Radio Times* a piece that reveals little and conceals much of what he knew:

> I shall not enjoy producing the Piddingtons on Friday the 13th, because it is their swan song. All the broadcast I'll be thinking of the past triumphs, and wondering why two such young people are going into retirement so early. The air of mystery which is not so much with them as following in the wake also engulfs this early retirement. … It is curious that after all these years of the Piddingtons' name being a household word that no one has ever satisfactorily answered the question "Are they genuine telepathist, or are they clever conjurers?" Themselves? They make no claim either way.

Now that question has been answered. Of course, Messiter and a handful of others knew the answer all along. ■

Acknowledgment

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Paul Zedane is the pen name of a retired media executive and writer with a degree in experimental psychology.

Jelly Beans and Bull: Challenging Alt-Med in Australia

Ten years ago, a cancer survivor joined forces with four professors to fight against government-legitimized health fraud in Australia. This is her story.

LORETTA MARRON

After my diagnosis with breast cancer in 2003, I saw firsthand my fellow cancer patients being targeted by alternative medicine practitioners. These poorly trained people claimed that they knew the secrets of preventing cancer, had a cure for it, and had a product that would prevent our cancers from returning. My local support group would invite these so-called "natural therapists" to our meetings. The patients, sometimes connected to drainage tubes, occasionally bald, and often with desperation on their faces, would sit on the edges of their seats listening to the slender and attractive naturopath—or the wizened and aged homeopath—who offered them hope without proof, at considerable cost, at a time when they felt abandoned by their faith or by medical science.

The underlying message was that we, ourselves, had caused our disease—eaten food cooked in a microwave oven, used margarine, eaten meat or genetically modified food, or didn't eat organic food; the list was long. Week by week, the guilt in each of these women grew. One naturopath assured me that she would not get cancer—but if she did, she would cure herself.

In Australia, patients are well looked after. Women are encouraged to check themselves regularly for breast lumps. If we find one, we get free mammograms. If cancer is detected, there is a follow-up call during which our disease is explained in simple language. From then on, we receive support from our doctors, oncologists, radiotherapists, and the rest of the therapeutic team. Help is always available. We are also told the five-year survival rate for our type of breast cancer. Treatment is free, and survival rates are good. I was given hope that I would be one of the nineteen out of twenty who would survive. It helped me cope.

We were also given brochures for families and friends offering suggestions for our loved ones on how to help us cope with the looming months of treatment. We could even ask for a breast-care nurse to "hold our hand" for as long as we felt the need. We were encouraged to go to a free "Look Good, Feel Better" group where we had fun trying on wigs and practiced using free makeup. But for many, this is not enough.

I noticed once that my oncologist seemed extremely interested in what I had to say. I asked her if I had suddenly become "interesting." She responded, smiling, that she was monitoring me for any signs of depression! She explained that it was common, and women are good at hiding it. This made their personal treatment journey more difficult. I have only praise for those who supported me through my own journey.

Loretta Marron invented the "Jelly Bean Lady" to challenge the pseudoscience of magnetic therapy.

'Saving Mankind'

Even before my diagnosis, I had taken exception to magnetic mattress underlays. Costing hundreds of dollars, these underlays are nothing more than a standard underlay with some magnets stitched into them. They were relentlessly advertised as treating not only pain but all sorts of other illnesses, and these advertisements target some of our most

vulnerable citizens, including our seniors.

Having majored in physics, I found these advertisements so painfully annoying that I decided to challenge them. I bought a few magnetic underlays from my local flea market (at much reduced prices) and a meter to measure magnetism. About two centimeters above the magnets, the reading was zero. I set up two small underlays—one with four jelly beans and the second with four magnets taken from an underlay—covered them with a piece of fluffy sheep skin, and handed "the meter" to true believers. I never had to explain whether or not magnetic therapy worked: zero is zero. They were convinced.

It was several years after my treatment before I felt mentally strong enough to get back to my attempts at "saving mankind." Being a cancer survivor with a science degree gave me credibility, so I invented the "Jelly Bean Lady." The media loved it. My first television appearance dressed as the "Jelly Bean Lady" challenged magnetic therapy. I encouraged people to "pop on a fridge magnet" if they wanted to try magnetic therapy. It went well.

Radio, television, magazines, and conferences followed. I was even invited a few times to go undercover for the *A Current Affair* TV program to expose "cancer cure" charlatans. I contacted Australian Skeptics and asked for help. When I needed anything—from legal advice to an expert for my radio segment—Australian Skeptics would soon call me back. Being on radio and TV is a great way to reach a large audience. Interviewing medical professions—such as a professor of medicine, a pharmacologist, or someone running clinical trials—helped me stay on the radio for more than two years. Where I could get my foot in the door, I did. Good topics, great guests, and a few games kept my segment interesting. This was the case until the sports season—then it was suddenly gone.

The Australian Skeptics also published several of my articles, including "Sex, Drugs and Rock 'n' Roll," "My Magnetic Personality," "Intelligent Design: Only a Man Would Think So!," and "Naturopaths: We're Dying to See Them." I had never written before my cancer diagnosis, but with the confidence gained from these publications, I went on to write articles for *Crikey*, *MJA Insight*, and pharmacy journals. I even had several articles in the Royal Automobile Club of Queensland magazine. I have also been published by, and interviewed for, overseas journals, including the *BMJ* and *HealthWatch-UK* (now *HealthSense*). I was featured in national and state-wide magazines and newspapers and have spoken at conferences across Australia and New Zealand—and in Brazil. Thanks to Susan Gerbic and her amazing Guerilla Skepticism on Wikipedia team, I now have my own Wikipedia page!

I was invited to write a chapter in Professor Ian Olver's book *Perspectives on Complementary and Alternative Medicines*. At that time, Olver was CEO of the Cancer Council Australia. I have received two Australian Skeptic of the Year Awards (2007 and 2011). I was awarded the Order of Australia Medal (OAM) in the General Division of the 2014 Australia Day honors in recognition of my service to community health.

Taking on Therapeutic Goods

The Therapeutic Goods Administration (TGA) is our regulator for all goods that make therapeutic claims. Since 2005, I have challenged homeopathy, herbal remedies, weight-loss and any other pills, pads, lotions, and potions that, although lacking credible evidence, were listed with the TGA. I also challenged "energy medicine" devices that were listed with them. Every removed advertisement and every canceled device gave me hope that I could make a difference.

In 2008, I worked with Dr. Ken Harvey on "Commercialism, Choice and Consumer Protection: Regulation of Complementary Medicines in Australia." Using TGA-listed weight-loss goods as an example, we showed that the "controls on the supply and promotion of complementary medicines in Australia are weak" (Harvey et al. 2008). In 2009, I worked with a team to review of the quality of complementary medicines information resources (Mcguire et al. 2009). This provided databases that people researching complementary medicines could use with confidence.

In June 2010, I noticed the chain pharmacy at my local shopping center had a near life-size cardboard cut-out of cricket superstar Glen McGrath standing at the entry to their store. McGrath was promoting vitamins, the sales of which would go toward the McGrath Foundation.[1] Unfortunately, vitamins help cells grow and might also help cancer cells grow, so patients are encouraged not to take them (Cancer Council NSW n.d.). I immediately drove home for my camera. Later that week, I challenged the McGrath Foundation, sending a report to every board member and a journalist. That particular campaign soon disappeared.

Taking on Registered Practitioners

In July 2010, the Australian Health Practitioners Regulation Agency (AHPRA) was set up "to help protect the public by regulating Australia's registered health practitioners." From that time, chiropractors became registered health practitioners. For the next five months, AHPRA received a monthly report from me on chiropractors' activities—each containing hundreds of images from chiropractic websites. Topics included anti-vaccination statements; inappropriate courses (which gained chiropractors the professional development points they are required to obtain to remain registered); techniques on how to target young families and images from magazines targeting young families; claims of cures for children with asthma, allergies, bedwetting, colic, ear infection, and autism; and so on. Primarily consisting of images from websites, names, addresses, and contact details, each report took me a week to prepare.

In November 2010, I was invited to speak at the interna-

tional The Amazing Meeting (TAM) conference that was being held in Sydney. There I met Simon Singh. I followed closely the court case in the U.K. when he was being sued by the British Chiropractic Association (BCA) for comments he made in the media. I spoke to him about my work on chiropractic. I also told him how his court case had affected my work in that the U.K. professors who usually helped me asked not to be quoted for fear of a libel action in a London court. When he returned to England, Singh interviewed me for his article "Nick Clegg's Civil Liberties Speech Strikes a Welcome Blow against Libel Tourism" (Singh 2011). He won the case against the BCA, but it cost him £100,000 and two years of his career.

Following my reports, in February 2011, I received an email from AHPRA inviting me to meet their lawyer to talk about my work. She assured me that what I was doing was important, but I needed to be patient because AHPRA was new and court cases would not be able to proceed until they had built up a body of evidence. I agreed with her, but as I traveled down in the elevator from her office, I wondered why chiropractors were targeting children.

It was two days later that I realized that they must be teaching it in our universities. I wrote to the health minister, asking her to shut down the Royal Melbourne Institute of Technology (RMIT) Paediatric Chiropractic Clinic. This gained international attention. The academic running the degree left the RMIT and became a member of the Board of the Chiropractors Association of Australia (CAA). This group represents the majority of chiropractors and supports the concept of the "disease-causing," nonexistent "vertebral subluxation complex."

FSM: The Beginnings

In mid-2011, the CAA advertised, on behalf of Central Queensland University (CQU), a position of project leader for their new chiropractic degree. I warned Professor John Dwyer that the disgraced RMIT academic would get the job. He did. Within a week of this CQU announcement, Professors John Dwyer, Rob Morrison, Alastair MacLennan, and Marcello Costa came together. A letter signed by more than thirty academics, mostly professors, asking them to rethink introducing that degree, was sent to CQU. They ignored it, but the letter received media attention.

Dwyer suggested that the five of us form an organization. If we could get thirty professors to support our cause, why not 1,000? We agreed; within two weeks, Friends in Science and Medicine (FSM) was born. Launched December 20, 2011, the aim of FSM is to foster good science in medicine. The Australian Skeptics had just written an article on pseudoscience-based courses in our universities. We wrote personalized letters to all the vice chancellors who were hosting these courses, asking them to remove them. We also challenged the Private Health Insurance Funds, which were including natu-

Friends in Science and Medicine Activities and Outcomes (often in association with others), 2011–2021:

- Removal of extravagant claims for acupuncture from the World Health Organization website and instigation of a WHO evidence review.
- Involvement in the 2015 Review of the Australian Government Rebate on Private Health Insurance for Natural Therapies. This led to the removal of coverage for therapies that lacked evidence, such as homeopathy, iridology, reflexology, and naturopathy (which is currently being reviewed again to see if additional evidence exits).
- Removal of unproven/disproven courses or modules from Australian universities.
- Removal of continuing professional development (CPD) points required annually by all registered practitioners for several alternative medicine courses.
- Following complaints to the TGA, removal of some illegal medicines not on the Australian Register of Therapeutic Goods (ARTG).
- Following complaints to the TGA, delisting of some complementary "medicines" and "medical" devices (such as bioresonance machines) that lacked evidence for claims.
- Getting the TGA to declare that two products, self-declared "Foods for special medical purposes," were illegal therapeutic goods and to remove them from the marketplace.
- Publishing academic articles in peer-reviewed journals documenting regulatory problems investigated and solutions suggested.
- Publishing articles on current problems in lay media, including *The Conversation*, *MJA Insight*, and *Pearls and Irritations* (around 200 over the past five years).
- Responding to consultation requests from the TGA, Medical Board (AHPRA), National Medicines Policy Review, and others.
- Registration suspension of anti-vax chiropractor Simon Floreani.
- Stimulating the Chiropractic Board to publish standards on pregnancy and pediatric care.
- Responsible for setting up AHPRA's "Advertising Compliance" section, including their pilot auditing system (yet to report).
- Responding to requests from many journalists for information.
- Correction of misinformation from the Victorian government's Better Health Channel.
- Providing an avenue for people who want to remain anonymous to complain.

ropathy and other pseudoscience-based interventions in their coverage.

Professor Alastair MacLennan coordinated the FSM Pathology Advisory Group, which includes distinguished pathologists from New Zealand. Results of pathology tests are often the basis for important decisions in health care. The report "Recommendation for Pathology Tests in Australia" (FSM Pathology Advisory Group 2013) is supported by the Royal College of Pathologists Australasia. We developed a *modus operandi* for dealing with AHPRA. We bombarded them and the Chiropractic Board with hundreds of practitioners websites' false claims. All needed investigation, overburdening the few AHPRA staff. Over the next few years, we provided many hundreds of examples of fraudulent advertising by osteopaths, acupuncturists, TCM (traditional Chinese medicine) practitioners, and some medical doctors.

No well-performed studies prove that acupuncture, "the perfect theatrical placebo," can alter any pathology.

We achieved a major reform when the deluge led AHPRA to appoint a senior executive to oversee them. Complaints about advertising led to a requirement that registrants respond within six weeks and stating the remedial action taken. Although positive, it could not change what a practitioner might actually *do*.

FSM soon turned its attention to the acupuncture scam. Marcello Costa's neuroscience expertise was invaluable. He wrote a review on acupuncture, "Is There Any Place for Acupuncture in 21st Century Medical Practice?" (Friends of Science in Medicine 2016), which was endorsed by the Royal Australian and New Zealand College of Obstetricians and Gynaecologists.

Most acupuncture is offered by TCM practitioners, but some registered doctors and physiotherapists offer it as well. "Credibility" had been provided by WHO's listing some 160 diseases/problems proven to respond to it. The underpinning theory is nonsense (i.e., not science). No well-performed studies prove that "the perfect theatrical placebo" can alter any pathology. FSM campaigned the WHO, and they eventually removed all the links from their website that claimed that acupuncture was proven to be effective.

In 2007, prior to the creation of FSM, I had challenged a range of energy medicine devices that were legitimized by TGA listing. It took three years, but they were removed. However, some remained, including the BICOM. As time went on, additional devices were also listed.

In 2019, following a campaign by FSM, the TGA commenced work on a sector-wide compliance activity relating to the advertising of "bioresonance" devices, which are sometimes mistakenly promoted as "biofeedback devices." As a result of their internal investigation, more devices were delisted (Therapeutic Goods Administration 2019). In January 2022, FSM launched a second campaign against "energy medicine" devices, documenting claims made on hundreds of websites. In March 2022, we were notified that they were "working with an external provider to procure an intelligence product to progress its bioresonance compliance project." We anticipate that more devices will be canceled from their register and more advertising will be removed.

In 2012, FSM was awarded the Australian Skeptic of the Year Award.

Importance of the Media

From the beginning, my aim was to get published in mainstream media, initially as myself and later as part of FSM. Every time I read a newspaper article that quotes a professor, pharmacist, or other medical expert, I track down the person's email. These included Professors John Dwyer, Alastair MacLennan, and Edzard Ernst, who continue to be called upon to comment in the media, both here and overseas. They have always been willing to provide me with comments and offer support.

Friends for Science in Medicine, or its executive members, have been in the media nearly 200 times in the past five years. If they are not being interviewed as experts, they are writing articles. From my initial dealings with the media, I have learned that journalists need a good story, so collecting data or ideas for them and providing high-profile experts might encourage them to write one. There are several ways a journalist can get expert advice. FSM is often contacted to provide experts for topics relating to alternative medicine, but for all articles relating to science, there is also the Science Media Centre. It is a great shame more journalists do not take advantage of these free resources, but perhaps their newspaper's advertising income takes precedence.

Change of Leadership

In 2019, the four professors, Friends for Science in Medicine's original cofounders, stepped down and became consultants. I remain as the chief executive officer. Having worked with him since 2006, I was delighted that Associate Professor Ken Harvey agreed to take on the position of president. The new executive members are Professor Paul Rolan, Professor Hubertus Jersmann, Dr. Paulina Stehlik, Dr. Ian Musgrave, and Kurt van Ryswyk. With so much misinformation and big profits from alternative interventions, it is unlikely that FSM will become redundant for years to come. We have recently challenged intravenous vitamin infusions, laser vaginal rejuvenation devices, and the food/medicine interface. We have exposed several alternative medicine practitioners who have been publishing COVID-19 misinformation and anti-vaccination statements.

As to our future, to quote our new president:

> The peddling of unproven and sometimes dangerous remedies has existed throughout human history. There will always be companies (and individuals) who put the pursuit of profit before ethical behaviour. There will always be advocates for de-regulation and regulators captured by industry. To protect consumers, there must be opposing forces. That is the role FSM is proud to play, along with colleagues from the sceptical community and consumer movement. ■

Note

1. After the death of McGrath's first wife to breast cancer, the McGrath Foundation was set up to raise money to fund McGrath Breast Care Nurses.

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Loretta Marron is a science graduate with a business background. She is a high-profile Australian campaigner against unproven and disproven health interventions. She was named Australian Skeptic of the Year in both 2007 and 2011 and again in 2012 as part of the Friends of Science in Medicine group that she cofounded in 2011. She is the only person to have won this award more than once. In 2014, Marron was awarded the Medal of the Order of Australia (OAM) in the General Division of the Order of Australia "for service to community health."

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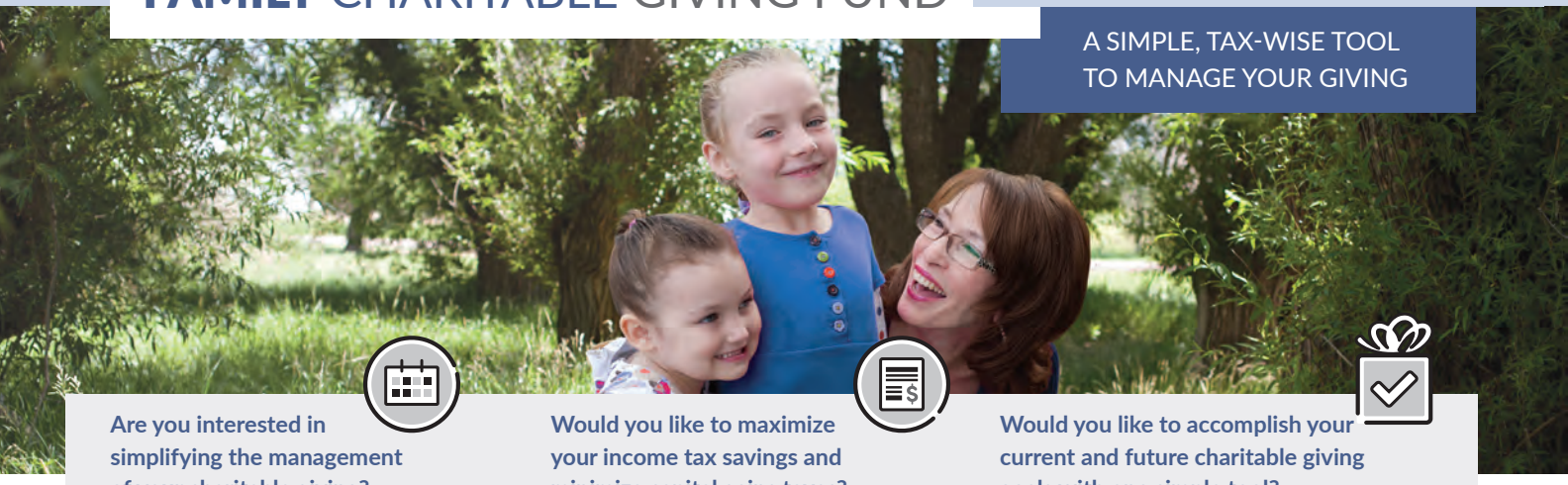

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The Mothman and the Crane: A Contemporary Perspective

In cases where eyeshine wasn't reported, is the sandhill crane the most likely candidate for Mothman sightings in the late 1960s? A contemporary look at the data and information "shines" new light on an alternative hypothesis.

DANIEL A. REED

The legend of the Mothman has pervaded modern cryptozoological lore since the late twentieth century, when the creature was first spotted near Point Pleasant, West Virginia, on November 15, 1966 ("Couples See Man-Sized Bird …" 1966). It was then reported by various witnesses for the next thirteen successive months (Monstrum 2019). The creature was originally spotted in what is now the McClintic Wildlife Area, locally known as the "TNT area," a region six miles north of Point Pleasant. The place acquired this moniker because at one point it was owned by the West Virginia Ordnance Works, a company that produced trinitrotoluene (TNT) for the United States Army during World War II. To safely store their product, the company built one hundred above-ground, steel-reinforced, concrete bunkers, which were dubbed "igloos" because of their domed construction.

When the company became defunct, the facility was abandoned, though these sturdy "igloos" are still standing and can be seen today (Sergent and Wamsley 2002, 10), sans any remaining TNT. As is generally the case with abandoned places, the area has an air of mystery about it, which lends itself nicely to the tale of the Mothman's presence.

The Mothman is allegedly an enigmatic cryptid of unknown origin who some claim was responsible for the Silver Bridge Collapse in Point Pleasant on December 15, 1967. Others take a different perspective and claim that the Mothman was not responsible for the collapse but rather came to warn the populace of the impending disaster (Sergent and Wamsley 2002, 24–25). While the idea that the Mothman was in some way connected to the Silver Bridge collapse is widely circulated as a possibility by those seeking to make a link between the creature and the tragedy, an analysis at the time by an Army Corps of Engineers investigator reported that the disaster was due to a flaw during the manufacturing of a component of the bridge's structure, an "eyebar." This eyebar had a micro-fine crack in it that widened over the course of the years from exposure to weather, and eventually the piece deteriorated to the point of breaking. When the eyebar broke, "it caused a chain reaction" of failures of the bridge's components, and the bridge collapsed (Sergent and Wamsley 2002, 6–7). This resulted in the tragic death of forty-six people (Sergent 2015).

Irrespective of perceived malevolent or benevolent intent, the Mothman, or some variant of the original entity, has made its way into popular culture. There are numerous references to it in music, television, films, games, and books (List of Mothman References in Popular Culture n.d.). There is even an annual Mothman Festival in Point Pleasant to celebrate the creature and seemingly all other things paranormal. Given its popularity, it seems the Mothman has undergone a cultural metamorphosis and has transformed from a fearsome harbinger of doom into a para-celebrity of renown.

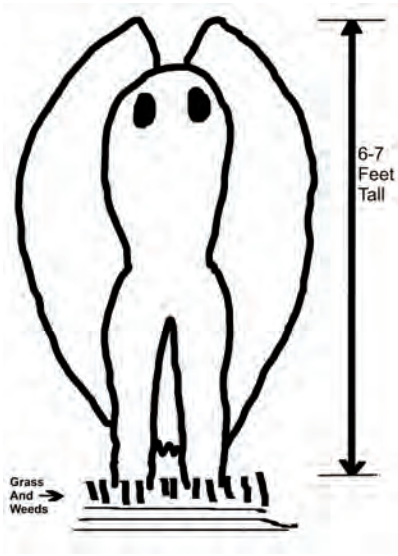

Figure 1 (A). Simplified interpretation of the original Scarberry drawing. (Drawing by author. Inspired by Sergent and Wamsley, 2002, 16.)

FIGURE 1 (B). Statue of Mothman in Point Pleasant, West Virginia. (Photo by author, 2016.)

Just as the public persona of the Mothman has continued to evolve, the iconography of the creature has also changed from the original hand-drawn images produced by the witness Linda Scarberry in 1966 to what it is at present (Nickell 2011, 180). In the beginning, the creature looked very much more owl-like than it does now. Over the years, representations of the Mothman have evolved to become more anthropomorphic in appearance, as evidenced in Figure 1.

Mothman Candidates

What was the Mothman, really? In truth we will never know for certain, but there are many ideas circulating as to its identity, both from 1966 and contemporarily. While some expla-

nations are otherworldly, one commonly held prosaic idea is that the cryptid creature's sightings were due to highly imaginative people partially seeing, and summarily misidentifying, owls. The assertion that some of the original sightings of the mysterious entity were likely an owl is at least partially based upon the initially reported shape of the creature as well as the "red glowing eyes" that it was purported to have had when lights were shown upon them ("Couples See Man-Sized Bird …" 1966). In his book *Tracking the Man-Beasts*, author Joe Nickell asserts, "Very likely the Mothman sightings were caused by barred owls, as well as other types of owls" (Nickell 2011, 177; see also Nickell 2002a, 2002b).

Another alleged culprit for some of the sightings was purported to be a wayward sandhill crane. In the December 1, 1966, edition of the *Gettysburg Times*, Robert L. Smith, an associate professor of wildlife biology at West Virginia University, "said the descriptions [of the creature] all fitted the sandhill crane, the second largest American crane, which stands as high as a man and has a wingspan of more than seven feet." Dr. Smith continued to say that "the 'red eyes' could be the large circles of bare reddish flesh around the crane's eyes." Smith concluded the article by asserting that "the bird apparently wandered out of its normal migration route" ("Monster Bird with Red Eyes May Be Crane" 1966). In a newspaper article of an unknown source, Smith is quoted as saying that he "was of the opinion there has [*sic*] been no previous sightings of the large … [sandhill crane] this far east" and that it "may have followed geese or other waterfowl to the McClintic Wildlife" area (Sergent and Wamsley 2002, 98).

Sandhill cranes are on average 47.2 inches in length (3.93 feet) and have a wingspan of 78.7 inches (6.56 feet) (Cornell Lab of Ornithology 2019a). Certainly, this is an impressively large bird, especially if seen in flight or in low light conditions without a reference point to accurately gauge its size. It is true that the sandhill crane has naturally occurring red spots around its eyes due to the "featherless red cap on their heads" (Wildlife Illinois n.d.). However, the likelihood that these reddened areas are apt to be reflective to the point of resembling "automobile reflectors," as attested to by eyewitness accounts (Keel 1991, 77), is questionable.

It is possible that a wayward migrant sandhill crane could serve as an explanation, especially for those sightings for which eyeshine was not reported. Interestingly, when examining the actual accounts of reported sightings, it is discovered that eyeshine was *not* reported in most of the cases. In his review of the various eyewitness accounts, author Benjamin Radford found that eyeshine was not "characteristic of Mothman sightings." Radford states that nearly a dozen people "claim to have seen the creature or had some personal connection to it. Of those only one person mentions glowing red eyes" and went on to say that her information was based on accounts of her father; she had not seen the eyes herself (Radford 2020).

Sandhill cranes are listed by the West Virginia Department of Natural Resources in their "Birds of West Virginia" checklist (West Virginia Division of Natural Resources n.d.). However, sandhill cranes in West Virginia were a rarity at the time

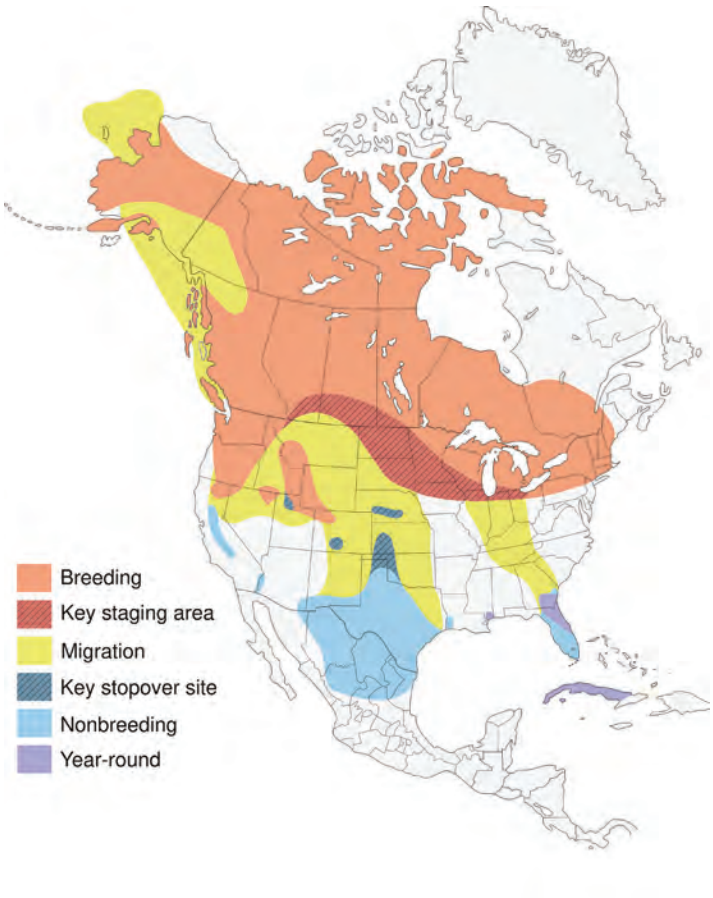

Figure 2. Sandhill crane range map. Note the migration path does not include West Virginia. (Cornell Lab of Ornithology 2019b)

and are still not common to this day. An article in the Sunday, November 20, 1966, edition of the *Athens Messenger* reported that Ohio University Zoology department officials disputed the sandhill crane hypothesis. "Ohio U. officials said there has never been a known sighting of the sandhill crane in this part of the country" ("Is Mysterious Creature Balloon or Crane?" 1966). See Figure 2 for the sandhill crane range map (Cornell Lab of Ornithology 2019b).

While this statement from the unnamed official at Ohio University sounds conclusive, a contemporary review of data reveals that it was, in fact, inaccurate. I consulted Dr. Tamaki Yuri from the Museum of Biological Diversity at the Ohio State University, and she recommended I review data from the Global Diversity Information Facility (GBIF) to investigate the statement. The GBIF aggregates and catalogs data about "all types of life on Earth" from museums, research facilities, and naturalists around the world, and it has compiled many years' worth of data for longitudinal studies of various species.

Using the GBIF website, I was able to define a polygonal search area that covered approximately a sixty-mile radius from Point Pleasant, West Virginia, looking for all reported instances of *Antigone canadensis* (the scientific name of the sandhill crane) within that area. The results were quite informative.

The data revealed that there indeed were sightings of sandhill cranes in and around the Point Pleasant area prior to 1967. In fact, the earliest reported sighting of the crane in Point Pleasant was in 1938, along with fifty other sightings within the defined sixty-mile radius from 1938 until August 2021. These data were confirmed with Dr. Yuri, who told me that the "expert who commented on the sand hill cranes back then couldn't even imagine that an aggregated database such as this would become readily available [one day] to prove or disprove his/her comment."

Despite their occasional presence in West Virginia, sandhill cranes do not commonly frequent the area during their migration, let alone for an extended amount of time, such as the thirteen-month span associated with the Mothman sightings. This assertion was affirmed by a study conducted by the U.S. Fish and Wildlife Service, Univerisity of Minnesota, and Western University that investigated the vernal and autumnal migration patterns of forty-two GPS-collared sandhill cranes from December 2009 through August 2014 (Fronczak et al. 2017). This study showed the distance of the migratory routes of the sandhill crane from the state of West Virginia were significant. The information from this study lends itself to support the assertion that sandhill cranes do not typically migrate through West Virginia during their fall or spring migration routes. However, David L. Fronczak told me that there is always the possibility that wayward migrant cranes could make their way farther east and into West Virginia.

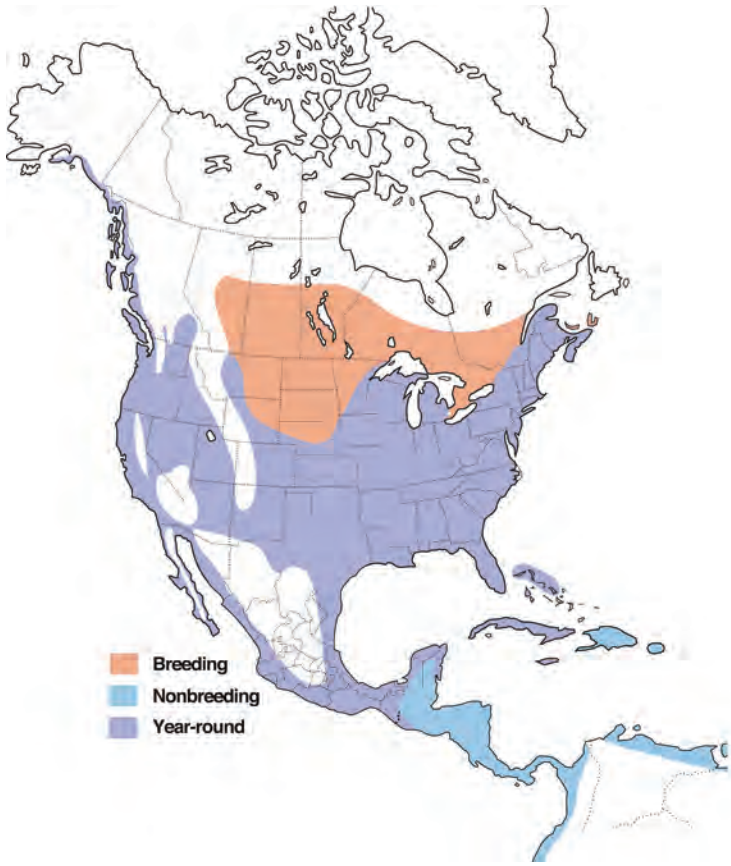

Figure 3. Great blue heron range map. The purple area represents a year-round presence. (Cornell Lab of Ornithology 2019g)

Mothman as Crane: Pro and Con

Examining all this information, would it seem that the sandhill crane is the most likely candidate for most of the Mothman sightings in Point Pleasant, West Virginia, as some assert? Is the bird common in the state? No. Did most people originally report seeing the "red" eyes of the Mothman, which were explained as being the red patches around the eyes of the sandhill crane? No. In fact, only one person reported this, and it was secondhand information at that. So, given this, in those cases where eyeshine was not reported, what other explanations for the sightings are likely?

One practical hypothesis suggested was that some of the sightings of the Mothman were attributable to geese ("Is Mysterious Creature Balloon or Crane?" 1966). While geese can certainly be large birds—between 29.9 inches (2.49 feet) and 43.3 inches (3.6 feet) in length (Cornell Lab of Ornithology 2019c)—they are quite distinctive. One cannot be around a goose or flock of geese without noticing that geese have a very characteristic "honk" that they make, even sometimes while flying. This distinctive "honking" noise could certainly identify a goose as a perpetrator if the noise was made by the bird. While some sightings may very well be attributable to a silent goose, there is yet another suspect in this lineup of potential candidates for the sightings that is perhaps better suited, especially when it is seen in low light, while in flight, or at a distance.

The great bird to which this article is dedicated is common to the geographical area of Point Pleasant and has been suggested as a candidate for the Mothman in the past. When in 1966 the Mason County (the county in which Point Pleasant is located) sheriff at the time, George Johnson, received reports of the Mothman, he was cited by the *Williamson Daily News* as having said that he "was not discounting the stories he was told, but said he feels what was seen was nothing more than a 'freak shitepoke,' a large bird in the heron family." The article goes on to say, "The shitepoke, sometimes called a shag, is the smallest heron in the Western Hemisphere" ("Eight People Say They Saw Creature" 1966).

This statement in the newspaper article is quite perplexing. How could the bird in question be both a "large bird" and yet be "the smallest heron in the Western Hemisphere?" The answer may lie in what various types of fauna—in this case species of heron—are referred to as colloquially.

Colloquialisms can be hard to define, and sometimes colloquial sources are needed to ascertain their meanings. A cursory search of the internet for "shag heron" reveals a 1934 fiddle song titled "Shag Poke" and may lend some insight into the terms in question. In the description that accompanied the song, the following text is cited: "*Shag Poke* and *Shy-poke* are names for a Great Blue Heron in Missouri and elsewhere in the MidWest. The term may have derived from the bird's penchant for defecating while flying (*shite poke* or *shit-a-cord* are also names associated with it), which is also sometimes called a Blue Crane" (Traditional Tune Archive 2019).

As Joe Greathouse, assistant professor of biology at West Liberty University, told me during a phone interview, great blue herons are common in West Virginia. As stated, the *Williamson Daily News* referred to a "shag heron" and went on to say that the shag heron is the "smallest heron in the Western Hemisphere." This quote may be referring to the comparatively small green heron, which is also common in West Virginia during its breeding season (Cornell Lab of Ornithology 2019d). The green heron is on average between 16.1 and 18.1 inches (1.34 feet to 1.51 feet) in length, and in terms of its body, it is more comparable to the size of the common crow (Cornell Lab of Ornithology 2019e). In contrast, according to audubon.org, the great blue heron is the largest heron in North America and is often referred to as a "crane" (National Audubon Society n.d.).

The Mothman was reported by Linda Scarberry to be "about seven feet tall" (Sergent and Wamsley 2002, 20) and was reported by another individual identified only as "Eyewitness #1" as "running" and "appeared to be a man about 6 feet tall" (Sergent and Wamsley 2002, 61). These two assertions suggest that the full body of the creature when on the ground would have been quite large, possibly as tall as seven feet. It would be curious, and seems unlikely, that the sheriff would refer to a bird as small as the green heron when hypothesizing an explanation for sightings of such a large creature. His use of the term *shitepoke* in this case would seem to be more applicable to the larger of the two birds. Given the foregoing, it is possible that the use of such colloquialisms may play a part in the confusion of what was said to the newspaper versus what was meant in the way of a potential explanation by Sheriff Johnson in 1966.

The debate associated with properly identifying colloquial terminology for various species of cranes or herons is beyond the scope of this article. Any attempt to determine what was meant by the sheriff, as opposed to what was interpreted by the reporter, will only result in unresolvable speculation. Nevertheless, irrespective of what these great birds are called locally, a definite connection emerges between herons, the geographical location of Point Pleasant, and extant documentation at the time suspecting some form of heron as a potential explanation for the Mothman.

In terms of size, the great blue heron is comparable to the sandhill crane. The Cornell Lab of Ornithology reports that great blue herons can range in length from 38.2 (3.18 feet) to 53.9 inches (4.49 feet) in length (Cornell Lab of Ornithology 2019f). The distinction between the two great birds as candidates for being mistaken for the Mothman comes not from their size but rather from their commonality to the area. The Cornell Lab of Ornithology website All About Birds provides insight into the range of the great blue heron, which is shown to be in West Virginia year-round (Cornell Lab of Ornithology 2019g; see Figure 3 on p. 54).

Previously, I had used the GBIF website to examine the sightings of the sandhill crane, and I determined that there have been fifty-one reported sightings of the crane from 1938 to the present. Using the same geographically defined polygonal search area—but this time searching for the great blue heron (*Ardea herodias*), I found 5,576 sightings from 1907 to the present. Given these data, it seems plausible that if one saw a large, gangly, crane/heron shaped bird in the area, it would statistically be more likely to be a great blue heron than a sandhill crane. This assertion is further supported by a telephone interview I conducted with David McClung, a West Virginia Department of Natural Resources officer who is responsible for the McClintic State Wildlife Management "TNT Area" of Point Pleasant. McClung revealed that great blue herons are very common and can be seen daily in that area, even well into the winter months. McClung said that he has seen many great blue herons in the vicinity. He went on to tell me, "I have worked that area for thirty-three years, and I have never once seen a sandhill crane out there."

For another perspective, I conducted an additional telephone interview with Joe Greathouse, assistant professor of biology at West Liberty University, who provided further confirmation of the presence of great blue herons in the Point Pleasant area. Greathouse stated that the great blue heron is common throughout all of West Virginia and that it is the "most common wading bird in the state." Greathouse went on to tell me that great blue herons are prevalent in Point Pleasant "because of the wetlands in that area."

It should be noted that just because animals are common to an area, it does not necessarily follow that the people who live in that area are familiar with them. In his book *What the Robin Knows* (2012), Jon Young, a naturalist and expert tracker, cites several instances of human residents being unaware of the presence of their various animal neighbors in a geographical area (Young 2012, 49–50, 82–83, 166, 173). How many people live in an area where bear, fox, or weasel are quite common, yet people rarely (if ever) see these animals? Occasionally people might stumble across the animal's tracks or other signs of their presence—assuming they are even looking for such things—but they may otherwise go for years without ever seeing the actual animal itself. Therefore, the argument, "If these great birds are so common, why wouldn't people have known what they were seeing?" becomes less profound. Just because great blue herons are common to an area does not mean that people who live there regularly will see them or would be able to accurately identify them when they did.

The intent of this article is not to dismiss the sandhill crane hypothesis outright. As we have seen, sandhill cranes are *occasionally* spotted in West Virginia. Instead, my purpose is simply to look at existing data related to these great birds to determine what the likelihood of such a sighting might have been and hopefully bring new information into the discussion on the Mothman that has not been previously examined.

In conclusion, there is little doubt that individuals saw *something* in the Point Pleasant area during 1966–1967. What that was remains undetermined, and there is still much speculation about the matter. While the barred owl accounts for the large, bicycle-reflector, circular eyes reported in some of the cases, the sheer reported size of the creature lends itself to potentially being the great blue heron (or perhaps a sandhill crane), particularly in those cases where the creature was witnessed at a distance or even in flight.

Sandhill crane taking flight on foggy sunrise

It is clear that no one will ever be 100 percent certain in accounting for who saw what in each reported case of the Mothman sightings. It is possible that the stories of sightings of many different creatures, be they sandhill cranes, great blue herons, geese, barred owls, or others, have merged over time. Through confabulation (and perhaps in some cases intentional prevarication) and through the retelling of tales with occasionally misremembered facts (or perhaps through outright embellishment) the stories have evolved into a form the folkloric legend that we have in the Mothman story of today.

There's a question we must ask ourselves: Which is more likely? Did an alien from another planet or plane of existence visit Point Pleasant, West Virginia, in 1966, or is it more likely that people saw one or more large birds with which they were not readily familiar and mistook for something else? In the analysis of the facts, we must also ask ourselves another question: Is it more likely that a rare, wayward, migratory sandhill crane was spotted in Point Pleasant for more than a year, or is it more likely that a large bird common to the area, such as the great blue heron, was spotted and mistaken for something else? Perhaps Occam's razor, a premise asserting that the explanation with the fewest assumptions is most likely correct, provides us insight into how to consider both questions.

I recently visited the McClintic State Wildlife Management "TNT Area" of Point Pleasant. It is a beautiful place that is unique in the topography of the hills of West Virginia. Upon entering the area, a great blue heron flew from its perch high up in one of the trees and majestically took to the sky, quickly fading from sight behind the verdant tree line. It was a large specimen, but I could not determine the exact size. For one familiar with the species, it was easily identifiable by its silhouette against the sky. It was from that singular sighting that this research was born. Given the foregoing, perhaps the great blue heron will finally get the consideration that it deserves in one of the greatest folkloric mysteries associated with the great state of West Virginia. ■

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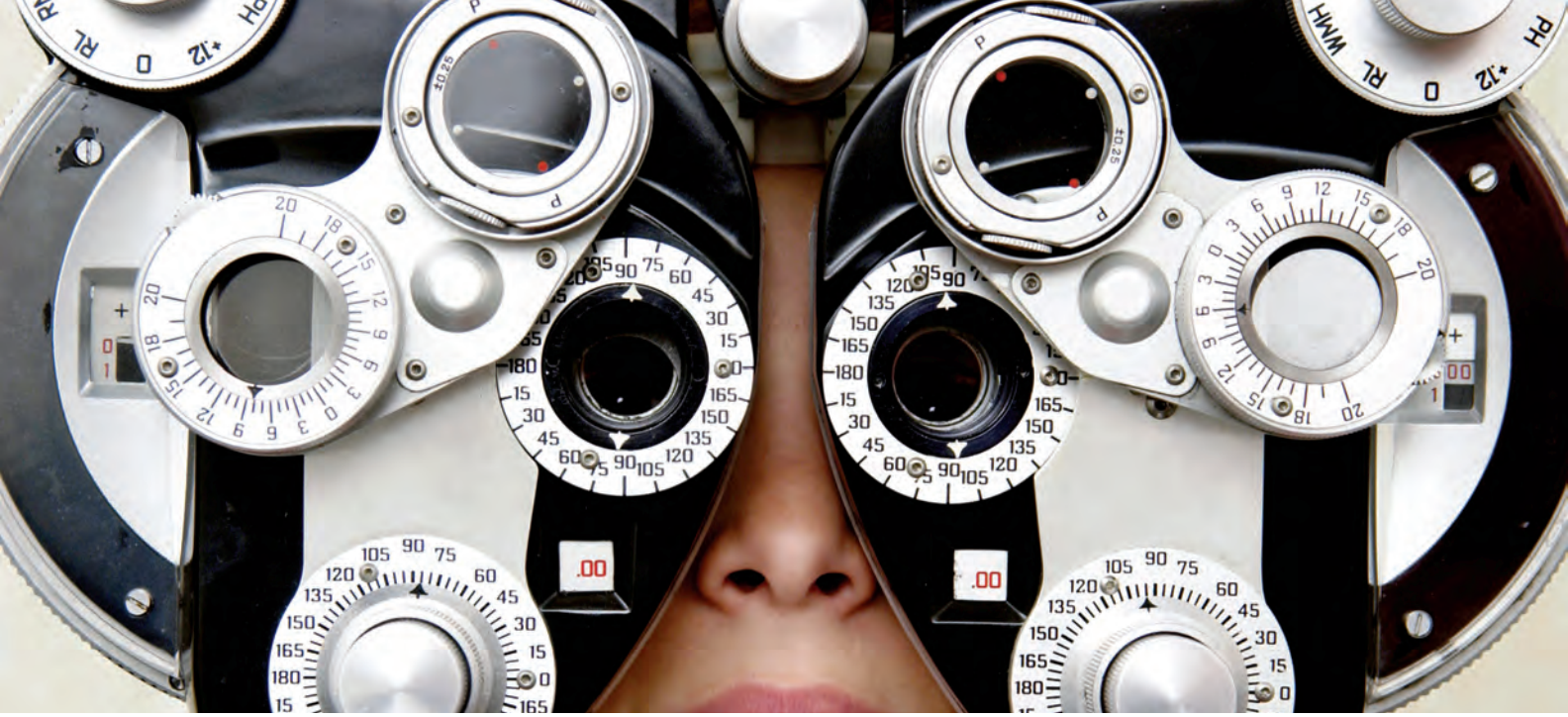

What Everyone Should Know about Human Vision

Learning a little about how we see can go a long way toward avoiding self-deception.

GUY P. HARRISON

It is close to impossible for anyone to intuitively understand the complex and surprising process of human vision. As a result, most people do not have a fundamental grasp of how they see. This is an odd state of affairs, considering how much we rely on vision. Although the science is not complete, enough is known for us to think more sensibly about what we "see" and prevent us from placing too much trust in our observations. Unfortunately, overconfidence is common. I encounter it frequently during talks and interviews concerning extraordinary claims and critical thinking issues. Without hesitation or reflection, many people award unjustified credibility to eyewitness accounts of alien visitations, Bigfoot, ghosts, etc. (Harrison 2013).

Science has revealed that human vision is much closer to cognitive theater than video surveillance. But how many people know this? How many are unaware that seeing is largely a *creative act*, a process that presents us with a *version of reality* rather than an accurate reproduction? Our eyes and brains simply do not capture and display the world as it really is. The brain instead produces a customized representation of a scene. What we see, as a matter of routine, are functional fantasies meant to be of practical use. If more people filtered every important observation through an awareness of this, it could substantially reduce self-deception and irrationality. And that would be a significant step toward a more sensible world.

A Quick Glance at How We See

Human vision begins when photons (particles of light) hit the eye. The retina performs a bit of nature's magic by converting this light energy into electrical information, which then races along the optic nerve to the brain. Once there, this raw data is read or translated as patterns. This is how we identify a big round shape from a small square shape or recognize that an attacking lion is not a beautiful flower. Though strange and imperfect, our vision works well enough for us most of the time. After all, our species can juggle, fly airplanes, and paint landscapes. But cognitive missteps are common because the normal vision process includes seeing things that are not there and missing (or wildly misinterpreting) things that are. Too many people wrongly assume that human vision works something like a camera, accurately relaying reality into our brains. This is a problem because excessive trust in the eyes can make one less likely to entertain doubts or seek confirming evidence after witnessing something significant. We all are prone to fooling ourselves in many ways, but excessive trust in vision is one of the quickest and surest routes to self-deception.

Vision takes up a large portion of overall brain activity, so it makes sense that the brain would seek efficiency by minimizing data clutter. When we look at a lawn, we do not need to be swamped with the visual detail of every blade of grass.

Unfortunately, most people probably don't realize just how much detail is left out. The brain only shows us an extremely small area in conscious focus. Typically, more than 99 percent of the surrounding environment is effectively absent; in other words, we miss a lot yet don't notice what's missing (Chabris and Simons 2010). Perhaps most troubling, however, is how our beliefs and past experiences can influence what we see.

Most people I engage with on this topic are shocked to learn that fill-in images of things not present can be wholly created based on what the subconscious brain deems useful, desirable, expected, or consistent with a belief or assumption. They tend to be even more surprised when I explain that research shows we may naturally place *more* trust in these made-up visual images than we do images of things present in reality (Ehinger et al. 2017). So, to recap, scenes we see in our heads are not only incomplete and highly edited but also routinely include imaginary elements. It is as if there is a screenplay to consult and we all have a Hollywood CGI special effects team in our heads. We do not see the world; instead, we watch internal movies about the world. To be fair, let's call them docudramas, presentations rooted in fact—but with ample artistic leeway.

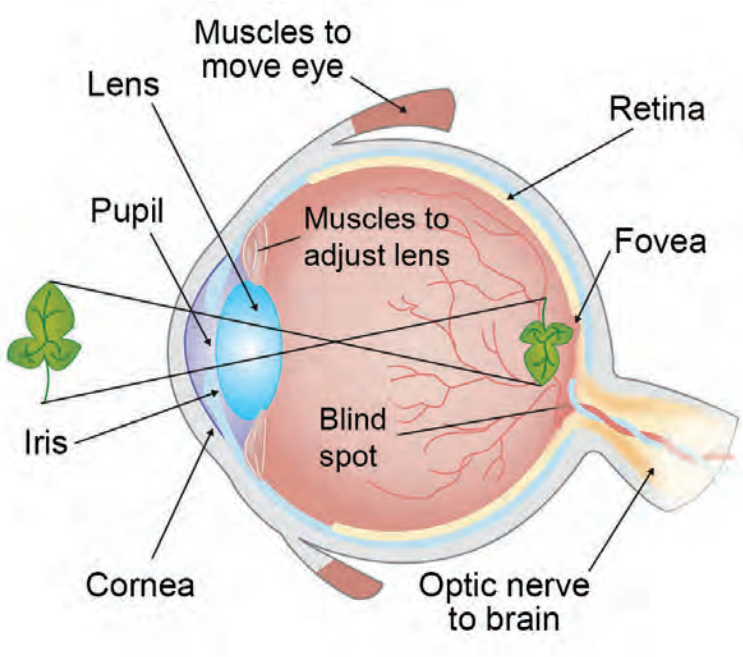

Image Courtesy of Arizona State University - Ask a Biologist.
Figure Illustrated by Gustavo Castaneda.

Seeing Is Believing vs. Believing Is Seeing

If one morning, for some unknown reason, a large hole opened up in your living room floor, you might not see it. It's right there in front of you. Your eyes travel over it. But it goes unseen in your brain. Why? You don't see it because it shouldn't be there. It's an unexpected deviation from the reliable playbook. You believe in a solid living room floor, and that is what your brain sees. So, you step into the hole and fall to your death.

The influence of belief on our visual perceptions likely explains countless eyewitness claims of extraordinary and unlikely phenomena. An unidentified light in the sky, for example, might be seen very differently by people with different beliefs. Based on what we know about the interplay between belief and vision, enthusiastic UFO believers would be more likely to see an "obvious" alien spaceship in considerable detail than those who do not hold the prior belief. The line from Frank Herbert's 1965 novel *Dune*, "Hope clouds observation," comes to mind.

Not only do we fail to see the world accurately or in full, but we also do not see it in real time. Everything we observe around us is old news. It already happened (Maus et al. 2013). We visually experience our environments with a delay of hundreds of milliseconds. That may not sound like much, but sometimes it matters. To cope with this when confronted with a fast-moving ball, fist, or car, the brain shows us an image of the object in places where it *should* be according to on-the-fly estimates of speed and direction. We experience "seeing" it in our minds even though our eyes and brains can't work fast enough to see it in reality. While this works most of the time, some unknown but significant number of stumbles and traffic collisions likely result from the brain getting these predicted movements wrong. "What we perceive doesn't necessarily have that much to do with the real world," explains Gerrit Maus, a cognitive neuroscientist and expert on visual perception, "but it is what we need to know to interact with the real world" (Anwar 2013). So, despite the strikeouts, our visual system is good enough to keep us in the game.

None of this information is meant to belittle or denigrate our eyes and brains. The system of human vision is amazing and wondrous, a magnificent evolutionary achievement. But it is vital that we understand its unusual ways and keep a close eye on the peculiar vulnerabilities that come with it. ■

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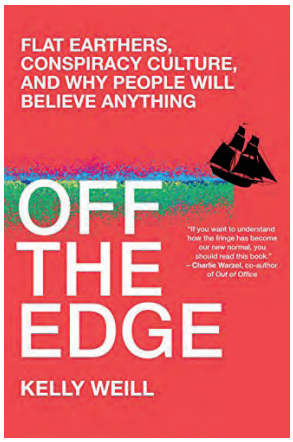
Guy P. Harrison is a passionate advocate for science and reason, an award-winning writer, and author of eight books, including *At Least Know This: Essential Science to Enhance Your Life* and *Think: Why You Should Question Everything*. Find Guy on twitter at @harrisonauthor.

On the Ball

GLENN BRANCH



Off the Edge: Flat Earthers, Conspiracy Culture, and Why People Will Believe Anything. By Kelly Weill. Chapel Hill, NC: Algonquin Books of Chapel Hill, 2022. ISBN 978-1-64375-068-2. 256 pp. Hardcover, $27.95.

In the final chapter of her book *Flat Earth: The History of an Infamous Idea*, Christine Garwood estimated "there are probably no more than a few thousand flat-earth believers alive in the world today and fewer still who would be willing publicly to declare their conviction." That was in 2007. Fifteen years later, flat-earth conventions pull in hundreds of attendees, social media websites pullulate with thousands of flat-earth videos, and the globe is populated by millions of people who believe—or are at least willing to tell pollsters that they believe—the earth is flat. In *Off the Edge*, Kelly Weill, a journalist for The Daily Beast who specializes in covering extremism and disinformation, both updates the history of flat-earthery to encompass the age of the internet and explores the deepening immersion of the flat-earth movement in a disturbingly toxic conspiratorial milieu. Alert, informed, and up-to-date, *Off the Edge* is aptly describable as on the ball.

The first three chapters provide a capsule history of the flat-earth movement from 1838, when Samuel Birley Rowbotham decided that the Old Bedford Canal in Cambridgeshire, England, was the ideal place to demonstrate the flatness of the earth, to 2001, when Charles K. Johnson, the lonely last president of the International Flat Earth Research Society, died. Although Weill's account accords with the detailed histories provided in Garwood's *Flat Earth* and Robert J. Schadewald's *The Plane Truth* (2015), it is largely based on her research in the original sources, enabling her to provide information and insight not present in its precursors. Her account is also amusingly punctuated by her personal reactions: for example, she writes, of Lady Blount's flat-earth wish-fulfillment novel *Adrian Galilio* (1901), "I adore this bizarre little book," and proceeds to describe how "I conscripted a friend to record a version of a song" included in the novel "with lyrics railing against godless 'globeites'" (34).

What resurrected the flat-earth movement in the twenty-first century was the rise of the internet: "the sudden surge in available information gave rise to a rich conspiracy culture" (79), with figures such as Mike Adams and Alex Jones—not themselves flat-earthers—setting the tone. The comparatively sedate and scholarly Flat Earth Society, established online by the pseudonymous Daniel Shenton in 2004, was soon eclipsed by extremist flat-earth entrepreneurs such as Eric Dubay, who "eventually accused the Flat Earth Society of being a fake group designed to discredit the movement, due to its more modest conspiratorial stances" (94). However, it was not just the new platform of the internet that encouraged flat-earthery; the social media company algorithms that suggest new material for users to peruse often present them with a series of increasingly crazy conspiracy theories. Facebook and YouTube have attempted to fix the problem, with imperfect success, but the damage was already done.

A fair amount of *Off the Edge* is devoted to recounting the damage. Weill is sympathetic to Nate Wolfe, a pastor who lost his job over his flat-earthery, and to "Mad Mike" Hughes, a daredevil who lost his life while attempting to test his flat-earth beliefs in a home-made steam-powered rocket. (There are conflicting reports about whether Hughes was a sincere flat-earther, which Weill assesses judiciously.) Flat-earthers are often socially isolated on account of their beliefs; although the modern flat-earth movement is sustained partly by a sense of community among beleaguered believers, factions and feuds among them are rife. Those who forsake the flat earth face a further set of problems. But the rest of us suffer from flat-earthery too. Aggressive and confrontational proselytization by flat-earthers—which they call "flat-smacking"—is not unknown, and there have been sporadic threats of violence against Facebook and YouTube over their moderation of their flat-earth users, as Weill describes.

Worse, though, is the way in which flat-earth beliefs are increasingly immersed in a toxic conspiratorial milieu that now seems to encompass anti-vaccine sentiments, QAnon, and—inevitably—anti-Semitism. The Wisconsin

pharmacist who deliberately ruined a batch of COVID-19 vaccines? The Californian who was smoking marijuana while invading the United States Capitol during the January 6, 2021, insurrection? The habitués of a neo-Nazi website who gleefully adopted "usernames like InterJew, 3rdRicht, and SouthernFascist" (190)? Flat-earthers all, apparently. Weill's discussion of these conspiracy beliefs and their adherents is often harrowing, so her wry humor, present throughout the book, is particularly welcome here. After acknowledging the Indic roots of Nazi and neo-Nazi emblems such as the swastika and the sonnenrad, for example, she explains, "If you wear a swastika T-shirt on a public stroll in the United States, you're probably a jerk, not a Jain" (182).

Toward the end of her book, Weill offers a few thoughts about combating the flat-earth movement. She plausibly urges that social media companies such as Facebook and YouTube need to take further action: not merely fact-checking, which is of dubious efficacy, but fixing their recommendation algorithms and, when necessary, banning particularly egregious characters, such as Alex Jones. Such actions will be of only limited effectiveness, but individual interventions are still necessary. In these, Weill suggests, "Maybe we need to approach debunking less like a debate and more like holding a friend's hand" (212)—so a little empathy makes the world go round? Unfortunately, the ensuing discussion is centered on just two case studies. Weill would have done well to consult Lee McIntyre's *How to Talk to a Science Denier* (2021), which is based not only on McIntyre's own conversations with flat-earthers but also on a review of the relevant psychological literature, for a model of a systematic treatment.

Not to be unduly captious, but there are a handful of minor problems with the book. The description of a rockoon as a "rocket attached to weather balloons that would carry it upward after the rocket fuel burned out" (153) is backward—the rocket is fired after the balloons carry it as high as they can—which suggests a deficiency in Weill's grasp of basic physics. Toward the end of the book, Weill speculates that flat-earthers are motivated in part by a desire for a cozy cosmos; perhaps so, but a similar diagnosis is available to flat-earthers, who have been known to argue that mainstream astronomy's insistence on the vastness of the universe is intended to scare, and thus enable control over, the public. And it is annoying that there is no index. But these, again, are minor problems. Weill's *Off the Edge* is not only a worthy successor to Garwood's *Flat Earth* and Schadewald's *The Plane Truth* but also a worthwhile contribution in its own right. ■

Glenn Branch is deputy director of the National Center for Science Education and a fellow of the Committee for Skeptical Inquiry.

Skeptical Inquirer Presents

NOTABLE GUESTS IN 2022

Now more than ever, people need to hear from the voices of reason, science, and skepticism. Unfortunately, all too often they are drowned out by the noise of misinformation, pseudoscience, and conspiracy theories—especially online.

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Steven Pinker
Rationality: What It Is, Why It Seems Scarce, Why It Matters

Paul Offit
You Bet Your Life: The Long and Risky History of Medical Innovation

Susan Gerbic
Herding Cats: Organizing Skepticism Online

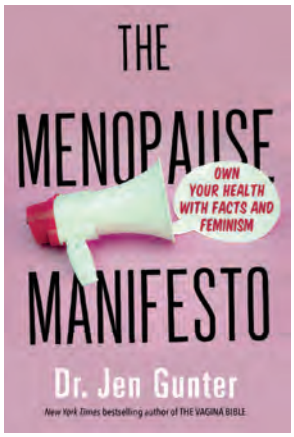
Melanie Trecek-King
A Life Preserver for Staying Afloat in a Sea of Misinformation

Timothy Caulfield
Infodemic: How the Hell Did It Get This Bad?

Rep. Sean Casten
FERC and FERCalicious: "The Most Important Organization You've Never Heard Of"

A Feminist Guide to Rethinking Menopause

JULIA LAVARNWAY



The Menopause Manifesto: Own Your Health with Facts and Feminism. By Dr. Jen Gunter. New York, NY: Citadel Press (Kensington Books), 2021. ISBN: 978-0806540665. 400 pp. Softcover, $18.95; e-book, $16.11.

The Guardian has referred to Dr. Jen Gunter, author of the best-selling *The Vagina Bible*, as "the world's most famous—and outspoken—gynecologist." In her follow-up book, Gunter lives up to that appellation. *The Menopause Manifesto: Own Your Health with Facts and Feminism* is just that—a manifesto that declares "what the patriarchy thinks of menopause is irrelevant. Men do not get to define the value of women at any age" (xii).

In her introduction, Gunter describes her subject: "Menopause is like being sent on a canoe trip with no guide book and only a vague idea where you are headed—although the expectation is it's awful" (ix). With *The Menopause Manifesto*, Gunter sets out to provide women everywhere with that missing guide. She gives them the tools to knowledgably handle the menopause transition and along the way pulls no punches in pummeling the patriarchy that denied women that guide in the first place.

As Gunter puts it, "For women to navigate menopause, they need facts because empowerment requires accurate information—but they also need feminism because our bodies, our medical care, and even our thoughts have been colonized by the patriarchy" (xi). As a case in point, Gunter reminds us, "It's … misogynistic to tie a description for one-third or possibly even one-half of a woman's life to the function of her uterus and ovaries. We don't define men as they age by an obvious physical change in their reproductive function. … Imagine a world where we said men were in *erectopause*" (22) (emphasis in original).

Words matter to Gunter, as they should to all good skeptics. She relates how the terms we use to describe menopause and its accompanying symptoms make a difference in how women in this time of life are perceived and treated. For example, she dislikes the term *hot flash*. It is inaccurate in that it implies a quick event, and it "can downgrade the severity of the experience" (16), thus contributing to the dismissal of menopausal women's symptoms. She prefers *hot flush* or, even better, *hot bloom*. Another term on Gunter's blacklist is *vaginal atrophy*: "Women are already diminished by society as we age, so a term that makes the vagina sound like a decrepit shrinking violet is unacceptable" (160). Gunter notes that thankfully this term has already fallen by the wayside.

Gunter gives women the tools to knowledgably handle the menopause transition and along the way pulls no punches in pummeling the patriarchy.

Gunter provides a history of the term *menopause*—it was coined in the early nineteenth century by Dr. Charles De Gardanne—as well as early attitudes of the medical establishment toward menopause and aging women in general even before that term was invented. She describes how the sixth edition of *The Ladies Physical Directory*, published anonymously in the eighteenth century by "A Physician," contained information on how to treat many conditions women experience during their menopause transition. Some of the "recipes" for treatments given in the book were harmful—"courtesy of the dangerous ingredients, such as oil of savin, arum root, and iron filings" (16)—and some were benign but ineffective. The directory also listed "a range of vaginal potpourri that would make Gwyneth Paltrow jade with jealousy" (16).

In addition to the jabs at Paltrow, there is much else for skeptics to love in Gunter's manifesto. In a section in Chapter 14, "Bladder Health: Breaking the Culture of Silence," on recurrent urinary tract infections (UTIs)—the risk of which greatly increases after menopause—Gunter breaks down the facts and myths behind treating and preventing UTIs. Gunter lists several

treatments that have been proven to help with recurrent UTIs, including vaginal estrogen and antibiotics. Then she lists several that many think help but have not been proven to do so—such as cranberry juice ("Most of the work here has been funded by—surprise—the cranberry industry" [181]), vitamin C, and emptying the bladder immediately following sex.

Another skeptical gem is Gunter's advice on "How to Do Your Own Research," which can be found in her chapter on *menoceuticals*, the author's term for menopause-related supplements. The bottom line of her advice is "avoid over-the-counter hormones" (303), but she offers readers questions they can ask themselves to evaluate menoceuticals, such as "How can this product help me in a meaningful way?" (301), "What do medical professional organizations [such as the North American Menopause Society (NAMS), the International Menopause Society (IMS), and the American College of Obstetrics and Gynecology (ACOG)] say about this supplement?" (301), and "Can I change my diet so I don't need the supplement?" (302). She ends the chapter with "P.S. I expect *a lot* of hate mail for this chapter" (303).

She also gives similar advice on how to know if you are seeing a trustworthy medical provider. For example, she tells women to look elsewhere if "the provider is antivaccine or engages in other medical conspiracy theories. … Medical conspiracy thinking is the opposite of rational, measured thought and has no place in medicine" (332).

Gunter's medical knowledge is impressive, but even more so is her ability to distill that knowledge into easily digestible morsels for a lay audience. She can simplify without dumbing down, something that is essential when relaying medicine and science to a general audience. Except for the final two, each chapter of Gunter's book ends with a sidebar of the "Bottom Line" of that chapter's main takeaway points. This is helpful for those who might want to read the main points of each chapter and then from there decide if they want to delve more deeply into the full chapter.

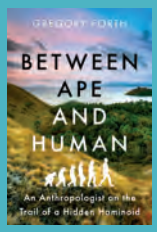
Gunter's book is well organized into twenty-five chapters in four parts, and there is a nice sprinkling of figures, tables, and charts throughout the chapters as well as in the Supplementary Material section at the back of the book. There is also a section of Selected References for those looking for more information. Unfortunately, there is no index, which I think would have been helpful for those reading the print version. For those reading an e-book, the search function makes the lack of an index less important.

Gunter's book is an impressive, invaluable volume. She handles what for many is a sensitive subject with compassion and humor, and she does so capably. She dedicated her manifesto "*For every woman*. Your awesomeness is unrelated to your estrogen." And that's exactly who should read this book and exactly the message they should take away from it. ■

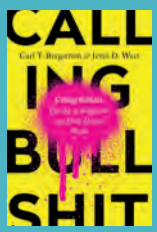
Julia Lavarnway is the managing editor of the Skeptical Inquirer.

NEW AND NOTABLE BOOKS]

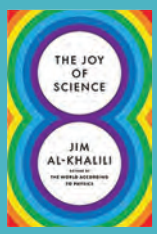
Listing does not preclude future review.



BETWEEN APE AND HUMAN: An Anthropologist on the Trail of a Hidden Hominoid. Gregory Forth. The author, an Oxford-educated longtime professor of anthropology, examines the so-called "hobbit" discovery that excited both scholars and the public in 2003: In a cave on the Indonesian island of Flores, skeletons of a small-statured early human species were discovered along with stone tools and animal remains. Dubbed *Homo floresiensis*, the ancient hominin barely reached four feet in height and was initially believed to have lived as recently as 12,000 years ago (later dating suggested it was significantly older). The discovery was reported in these pages; see, for example, Kenneth Krause's article "Pathology or Paradigm Shift?," July/August 2009. There are many aspects of this intriguing discovery, including whether the curious stature was due to a well-known evolutionary process called island dwarfism, a result of long-term isolation on a small, resource-scarce isolated island. In his anthropology research on the island years earlier, Forth had collected reports and legends of half-human, half-ape creatures said to live in caves on the slopes of a nearby volcano—a sort of Indonesian "Littlefoot." In this book, he explores the possibility of some connection and if the wild man stories might reflect a cultural memory of *Homo floresiensis*. Pegasus Books, 2022, 288 pp., $27.95.

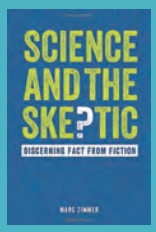


CALLING BULLSHIT: The Art of Skepticism in a Data-Driven World. Carl T. Bergstrom and Jevin D. West. "The world is awash in bullshit. And we are drowning in it," the authors begin. This book emerged from a course of the same title the authors teach at the University of Washington. They seek to teach how to think logically and quantitively about data. The authors observe that bullshit takes less work and intelligence to create than to clean up, and it spreads faster than efforts to clean it up—especially in today's social media world. Since this book's original publication in hardback in 2020, lead author Bergstrom, an evolutionary biologist, has become a major figure in the scientific community's campaign against misinformation. They end with a useful guide to "The Psychology of Debunking." This is the authors' clear, no-nonsense, call-it-like-it is clarion call to understand and fight nonsense. Random House, 2021, 318 pp., $18.00.



THE JOY OF SCIENCE. Jim Al-Khalili. The author, a theoretical professor of physics at the University of Surrey and a well-known science communicator, provides a handy little book about the pleasures of science and "thinking and living a little more scientifically." The success of science depends on its collaboration between scientists and nonscientists, he says. His aim is to explain "how thinking scientifically can offer you some control over the complex and conflicting information that the world throws at you." Eight chapters argue the case that there are "objective truths," point out that mysteries can both be embraced *and* solved, that evidence takes priority over opinion, that we need to change our minds in the face of new evidence, and other key components of scientific thinking. The final chapter is "Stand Up for Reality." Princeton University Press, 2022, 224 pp., $16.95.

PREVENTING THE NEXT PANDEMIC: Vaccine Diplomacy in a Time of Anti-Science. Peter J. Hotez, MD, PhD. Baylor College of Medicine physician and microbiologist Hotez, a familiar figure to viewers of CNN, Fox News, and MSNBC on behalf of good vaccine and masking practices during the pandemic, here addresses the rise in infectious and tropical diseases in this century due to war, shifting poverty, climate change, and "a new troubling anti-science." He was the U.S. science envoy during the Obama administration and served on a binational science foundation during the Trump administration. He explains how vaccine diplomacy might offer new solutions to the devastation of infections and how it might prevent future disease catastrophes. Johns Hopkins University Press, 2021, 192 pp., $27.95.



SCIENCE AND THE SKEPTIC: Discerning Fact from Fiction. Marc Zimmer. Zimmer, a professor at Connecticut College and an author of several young adult books, offers this slender, nicely designed guide to what science is and how to distinguish between real science and fake science. It has five brief chapters: What Is Science?, Fake Science, This Is Science Not Politics, Quackery, and The Twenty Rules. The latter offers twenty succinct rules to help "distinguish between science and bad science, medicine and quackery, and fact and fiction." Examples include a reminder that publication in peer-reviewed journals is generally legitimate while publication in predatory journals isn't (he provides a link to a list of 2,500 of the latter) and to "Beware of medical products and scientific ideas promoted by celebrities." Twenty-First Century Books, 2022, 120 pp., $27.99.

SCIENCE DENIAL: Why It Happens and What to Do about It. Gale M. Sinatra and Barbara K. Hofer. Two psychologist authors (University of Southern California and Middlebury College, respectively) concerned about public understanding and misunderstanding of science take on the persistent and growing problems of science denial, doubt, and resistance. From their own and others' research into the psychology of thinking, they shed light on the key psychological reasons for these trends and offer steps to support public understanding of science. Chapters deal with such things as making sense of online science claims, what motivates people to question science, how emotions and attitudes influence science understanding, and what we can do about the problems of resistance and denial. Oxford University Press, 2021, 193 pp., $36.00.

—Kendrick Frazier and Benjamin Radford

Skeptical Inquirer
STAYING AFLOAT IN A SEA OF MISINFORMATION
S.T. FLOATER
"Martian Dreams": Unusual Experiences and Perspectives on Aliens
Photographic Anomalies as Evidence of Miracles
Mindfulness Apps

Afloat in Misinformation

As a former teacher of undergraduate and graduate students, I appreciate Melanie Trecek-King's excellent articles in Skeptical Inquirer ("Teach Skills, Not Facts," January/February 2022, and "A Life Preserver for Staying Afloat in a Sea of Misinformation," March/April 2022).

They are the result of much thought, effort, and devotion. Her students are very fortunate to have her courses, and I wish her continuing success in her crusade to enlighten students.

Another area of deficient education is philosophy. Students should take at least a basic course introducing philosophy. All science graduate degree students should be required to answer the following question on their final examination: "How does science relate to the basic areas of philosophical inquiry (aesthetics, ethics, epistemology, logic, and metaphysics)?"

Ray C. Telfair II, PhD
Certified Wildlife Biologist
Whitehouse, Texas

I wholeheartedly agree with Prof. Melanie Trecek-King that we need to more effectively and consistently teach accurate thinking skills.

It's underappreciated, but I think vital, to teach accurate thinking skills persuasively rather than from authority. Many students won't accept and internalize the strictures of accurate thinking unless they understand why its rules are necessary. There's significant resistance to accurate thinking because it calls various wish-fulfilling beliefs into question. The evidence and justification supporting accurate thinking needs to be presented, or students may dismiss it as just another arbitrary system of faith.

For example, don't just declare that unfalsifiable claims aren't allowed. Explain that they can't be evidence-based because they can fit any evidence, so the fact that they fit the existing evidence is not meaningful. Describe the various experiments showing how malleable human memory is. Do classroom demonstrations of unconscious bias and the placebo effect. Play the telephone game. Have a professional psychic demonstrate cold reading and record what is said. Later, show how students' recollections of the psychic are inaccurate.

R. Allen Gilliam
Longwood, Florida

In Melanie Trecek-King's otherwise excellent article, there is some irony in the mention of deductive arguments because most of the standards she proposes are irrelevant for the formal sciences, such as mathematics, computer science, and logic itself. Falsifiability, Alternative Explanations, and Tentative Conclusions don't apply and Objectivity, Evidence, and Replicability have somewhat different meanings and are much easier to ensure. To address this, a one-sentence disclaimer would probably have sufficed.

Of course, most of these come back into play in looking at applied mathematics, statistics, and computing. Experiment design, modeling, and interpretation are each subject to the FLOATER tests. FLOATER also clearly applies to claims for software applications and their properties and to claims of efficacy in the process of modeling and development.

Thomas J. Marlowe
Prof. Emer. of Mathematics and Computer Science
Seton Hall University
South Orange, New Jersey

A good piece of writing should inspire thinking. Melanie Trecek-King's "Staying Afloat in a Sea of Misinformation" (March/April 2022) certainly did that.

She might consider *A*FLOATER, the first A being *Audience*. That is a mighty factor in presenting a claim or anti-claim if it is to be accepted. Scientists such as Galileo and Charles Darwin were rebuffed by then-current beliefs. The idea of insects as vectors of malaria, bubonic plague, and other maladies would have been derided before its time had come. Audience awareness is a definite tool in the box.

Her statement "But it's also true that science is a human endeavor, and humans are imperfect" is *so* relevant. It's well-known and frequently acknowledged, but it certainly bears repeating and could have headed the article.

Joan MacNeill
Portland, Oregon

See Daniel Kahnemann's *Thinking, Fast and Slow* for a model of thinking that explains how conscious rationality fails when a person is too busy, stressed, fearful, or tired. My look at some implications of this (at http://www.ccrsdodona.org/markmuse/philosophy/ratarg.html) runs to several pages, and it is still incomplete. The essential problem is that many people, much of the time, don't have the mental energy to even notice that they need to use FLOATER (described in Melanie Trecek-King's article) or any other tool of critical thinking, much less actually do the critical thinking.

The missing first step is Awaken Conscious Mind. Can SI ask any columnists or other writers to address this issue in the depth the topic really needs?

The situation in the United States is unlikely to improve as long as laws shield websites and broadcasters from liability for permitting (and profiting from) lies and decades of court rulings treat corporations as having the rights of people and treat money as speech.

Mark Pottenger
San Diego, California

Ghost Clothes

As a new subscriber to SI, I have enjoyed each issue thoroughly. I found the articles on ghost photos in the March/April 2022 issue perplexing, however ("Snapshot 'Miracles': Can Photographic Anomalies Be Evidence of the Supernatural?"). Each gave highly more plausible explanations for the images than the supernatural suppositions of their wanna-believers. But none of these articles asked about the one detail that has bothered and perplexed me over my forty years of being a skeptic: In these photos (or people's anecdotes, or movies, or TV shows), why aren't the "ghosts" naked? *Did their clothes die too?*

Never mind wondering about an afterlife. I wonder if there's a Phantom Fashions store in the hereafter to buy some ethereal duds for nonchalant haunting. I'm pretty sure most skeptics are materialists, so why do we not ask where these incorporeal beings get the "material" for their clothes?

Each article either shows or mentions the clothing of their discrete apparitions. Just sayin'. (And are we saying the only "realistic" depiction of a ghost is "Slimer" from *Ghostbusters*?)

Jim Feltner
Michigan City, Indiana

Kenny Biddle replies:

I must confess that the thought of walking down a dark hallway and suddenly being confronted by a transparent being in its birthday suit has me both giggling and feeling awkward. The idea of clothing returning from the great beyond has always baffled me. The classic "white dress" seems to be the fashionable choice for ladies, while all black is popular with gentlemen.

I've brought up this question to a variety of ghost hunters, psychics,

and mediums over the years. The answers I receive don't seem to vary much at all, with most claiming that ghosts have a magical ability to manifest clothing at will (in addition to walking through walls, floating, disappearing at will, etc.). According to such beliefs, ghosts create clothing from 100 percent "energy" rather than cotton. And there you have it: eternal life brings eternal fashion.

In reality, the reason ghosts have clothing is because they're not ghosts; they're living people caught by mistake. But I think you knew that.

Joe Nickell replies:

Just read my book The Science of Ghosts*, chapter 2 of which is titled "Naked Ghosts!"*

Carl Sagan

I would like to add the following to Robyn E. Blumner's column, "Remembering Carl Sagan," March/April 2022. After rereading *The Demon-Haunted World*, I find the following statement really perspicacious:

> I worry that … pseudoscience and superstition will seem year by year more tempting, the siren song of unreason more sonorous and attractive. Where have we heard it before? Whenever our ethnic or national prejudices are aroused, in times of scarcity, during challenges to national self-esteem or nerve, when we agonize about our diminished cosmic place and purpose, or when fanaticism is bubbling up around us—then habits of thought familiar from ages past reach for the controls. The candle flame gutters. It's little pool of light trembles. Darkness gathers. The demons begin to stir.

This reflects Sagan's Maxim: Extraordinary claims require extraordinary evidence, and claims without evidence can be dismissed without evidence.

Dave Hancock
Chesterland, Ohio

Talking to Science Deniers

"How to Talk to Science Deniers" by Massimo Pigliucci (March/April 2022) drew my attention for two reasons: The advice is good, in my view, but also incomplete. My background for the past four decades includes interventions with so-called cult members as a so-called deprogrammer. Rarely a day goes by that I am not communicating with someone about a cult problem or engaging in some other project related to problematic closed systems of belief and behavior. I agree with Professor Pigliucci that "there is a pernicious belief" among skeptics "that it's a waste of time talking to science deniers." If I've heard this a few times, I've heard it a few thousand times when someone approaches me for help.

Intervention can be brief, as the article mentions, or it can go on for days with discussion lasting ten or more hours a day. Of the latter type of intervention with consenting adults, I estimate that 60 percent of my nearly 500 cases succeeded in that the group member chose to leave the cult for good during the intervention. Why would an intervention succeed? To quote the article, "What is needed is a wedge that makes [science] deniers uncertain about … their beliefs." Wedges only work with leverage, and they can only be applied well when invited. A key to intervention is rapport (any seasoned salesman knows this); another is applying leverage.

Rapport is being authentically nice, patient, "listening" as the article suggests, and convincing the client or denier that you are worth listening to; you know what they believe and can recite it perhaps more thoroughly than they can. For example, at the start of one intervention with a young man dedicated for years to a controversial Hindu-based cult, he and I spent the first four hours explaining his beliefs to his incredulous family, then we began the slow process of expanding the Hindu tradition beyond the bounds of his cult system. In other words, I was on his side to start the intervention. He later told me he initially suspected that I was a Hindu!

Leverage, to me, is anything that helps you drive the wedge further and that can mean simply sustaining friendship—and rapport.

One final point is the common canard that losing a belief system will leave a damaging hole in the believer's social and psychological structure. The old challenge goes like this: *Well, if you take that away from them, what are you going to replace it with?* First, I was never able to "take" a cult devotion away from anyone; rather, they willingly gave it up because holding onto it proved useless if not damaging. Second, there is nothing to replace it, but tools for research and social self-strengthening are shared. Think of it as healing, not loss. No one loses a bad haircut, an ill-fitting wardrobe, a cold, or cancer. They reorganize, represent, or heal to what is a healthy state for them. Applied skepticism, if nothing else, can help us to remain in a healthier frame of mind.

Joe Szimhart
Stowe, Pennsylvania

Massimo Pigliucci suggests that one good strategy in seeking to disabuse science deniers of their misconceptions is to uncover the rhetorical tactics in their discourse. I agree entirely and have written an article in SI advocating the same ("The Rhetoric of Extraordinary Claim," September/October 2014). However, when Pigliucci then goes on to write, in regard to rhetorical analysis, "It's not rocket science, folks!," I must object.

The field of rhetorical studies has a history and tradition as deep and rich as that of most sciences, and while rhetorical analysis may not be as technical as that associated with most scientific fields, it may be just as sophisticated and insightful. I agree that one does not need a PhD in rhetoric to return the volleys of science deniers, but by the same token one does not need a PhD in planetary geology to successfully engage a flat-earther.

I hope we can all respect the many areas of study that may inform and advance skepticism and critical thinking.

Peter Marston
Professor of Communication Studies
California State University, Northridge

Massimo Pigliucci replies to Peter Marston:

Definitely my bad. I certainly didn't mean to insult the field of rhetoric, of which I am a big supporter. Cicero is my favorite ancient writer!

Don't Look Up!

Thanks to Mark Boslough for his discussion of the poor portrayals of scientists and scientific research in popular films ("Hollywood Finally Listened to Scientists," review of *Don't Look Up*, March/April 2022). I agree with his assessment of the character of Ellie Arroway in Carl Sagan's *Contact* as the gold standard for science in Hollywood, but he over-praises the portrayal of scientists in *Don't Look Up*. While they do indeed talk like real scientists, they don't act that way. Of the three scientist leads, only the NASA Planetary Protection Officer manages to stay focused on the predicted comet impact. For much better movie portrayals, I recommend the USGS geoscientists in *Supervolcano* and the CDC and WHO public health scientists in *Contagion*, who walk-the-walk as well as talk-the-talk. I much prefer to see scientists in films who inspire our admiration.

David Morrison
San Jose, California

In "Hollywood Finally Listened to Scientists," Mark Boslough praises the portrayals of astronomers and links the movie's theme of disaster from an incoming comet to the current global-warming crisis. But the current crisis is a gradual one, akin to the proverbial frog not noticing that it is being boiled alive, while the comet impact would be abrupt and take place in only a few months—so it is a very different type of worry.

Further, if you stay after the final credits, there is another scene of a shipload of survivors landing on a different planet in the distant future. So, humanity is not extinguished after all. (I wonder what small percentage, like me, always waits to the very end after film credits.)

Jay M. Pasachoff
Professor of Astronomy
Williams College
Amherst, Massachusetts

The motion picture *Don't Look Up* may feature "the best movie portrayals of scientists since Jodie Foster in *Contact*" (From the Editor, SI March/April 2022)?

Really? The typical male scientist is an overweight adulterer easily corrupted by money and fame? (Okay, not too implausible.) The typical female scientist is a hysteric who totally discredits herself by having a meltdown every time she is given a public forum? (I don't *think* so.)

In this sloppily written but often amusing film, when she has her first meltdown, there is no justification for it in the story up to that point. The character is acting as if she has read the screenplay and already knows how it will come out.

It's also something of a period piece. The film's image of a New Age billionaire seems to be based on the late Steve Jobs. In 2022, our image of a billionaire is a hardheaded technologist who builds rockets that actually work. One cannot imagine a Jeff Bezos or an Elon Musk getting involved in such a pathetic fiasco as the billionaire in the film.

Curiously, the film's bottom line seems to be that if we can't trust science or politics, at least we still have the solace of religion. I'm not sure that's how I would spend my last minutes on Earth!

Taras Wolansky
Kerhonkson, New York

No Murder?

After reading Joe Nickell's column "Murder at Mile End" (March/April 2022), I'd like to suggest an alternative solution to the crime.

My solution is that there was no crime. The lady was climbing the shelves of her closet to reach wallpaper on an upper shelf. The shelves tilted under her weight and threw her into the wall, making her hit her head. Her feet made the mark on the opposite wall. This explains all the rolls of wallpaper found around her body and the fact that nothing was missing. It also explains why her skirt was under her head and her front skirts were on her thighs: they flew there as she fell.

Gail Ludwig
Chesterton, Indiana

Joe Nickell replies:

Who says skeptics have no sense of humor? Why, Ms. Ludwig has invented a new genre: a "nonedunnit."

But just in case she is serious, her confirmation bias yields omissions: for example, the bloody foot imprint on the landing, the bloody finger marks on the victim's dress, and much, much more.

Having attended several detective schools, I believe mysteries should actually be solved. But then, humor has its own rules.

Sensing Mindfulness

In his column about meditation apps ("Hooked on Mindfulness," March/April 2022), Matthew Nisbet made a passing comment about "just four electroencephalography sensors" not being the same as the forty of a laboratory EEG. As an anesthesiologist ("anaesthetist" in the United Kingdom), part of my armamentarium of patient monitors are processed EEG monitors. These so-called "depth of anesthesia" monitors, when used to titrate general anesthesia or sedation, help avoid excessive hypnosis and cardiovascular side effects. This improves patient safety and recovery profiles.

I often joke with my patients—while applying the "just" four electrodes on their foreheads before induction of their reversible state of unconsciousness—that they are getting a free facial spa treatment as I scrub them with an abrasive paste. A typical EEG has a voltage < 100 microvolts, significantly less than the 2–3 millivolts of an electrocardiogram (ECG). For a reliable EEG signal, it is necessary to obtain electrode impedances < 5 kΩ on the three measuring leads and the reference lead. While I know nothing about "meditation headbands," I do know that in clinical medicine the *quality* of signals often matters more than the *quantity* of electrodes. Sometimes less is enough.

Dr. Pnt Laloë
Huddersfield, United Kingdom

Bigfoot Bears

I took great pleasure reading Joe Nickell's column pointing out that the geographical distribution of bigfoot sightings corresponds to that of bear populations throughout North America (January/February 2022). While reading his comparison of the anatomy of bears to that of their mythical counterparts, I couldn't help but recall my grandfather's comment regarding hunting ursids. Having worked most of his adult life in the logging industry in Northern Ontario, he was also quite fond of fish and game. As it happens, my hometown of Chapleau is sometimes nicknamed the black bear capital of the province. One day, as my grandfather was recollecting stories of his numerous moose hunting expeditions, I asked him if he had ever hunted bear. "Once," he told me. "But never again. When I took the pelt off that bear, I was struck by how human the body underneath looked. Creeped the hell out of me." I feel his anatomical observation only adds more weight to Nickell's comparison. On a final note, my grandfather refused to eat rabbit for the same reason: he felt that once skinned, they looked too much like tiny humans! Any hares out there being mistaken for tiny sasquatches?

Dr. Joseph Gagné
Historian and Postdoctoral Fellow
University of Windsor
Windsor, Ontario

[FEEDBACK

The letters column is a forum on matters raised in previous issues.

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